RESPONSE TO THE OFFICE ACTION

In response to the Office Action dated July 20, 2006, please consider the following remarks, which should result in the allowance of the above-identified application.

Claims 40-59 and 87-126 are pending in the application. Claims 40, 87, 92, 99, 105, 113 and 121, which are independent, have been amended and thereby obviate the 35 U.S.C. §112, first paragraph rejections. No new matter has been introduced by this amendment. Support for this amendment is provided throughout the Specification, specifically pages 10-14. Changes to the claims are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which the Applicants are entitled.

In light of the accompanying Certified English Translation, reconsideration and allowance of this application are respectfully solicited.

Claims 40-42, 44, 45, 57, 58, 87, 88, 90-95, 99, 100, 102, 104-106, 108, 112-114, 116, 117, 120-122, 124 and 126 were rejected under 35 U.S.C. 102(e) as allegedly anticipated by U.S. Patent No. 5,815,145 to Matthews, III (hereinafter, merely "Matthews"). Claims 43, 46-52, 59, 89, 96-98, 101, 103, 107, 109, 110, 115, 118, 123 and 125 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Matthews in view of U.S. Patent No. 5,907,323 to Lawler et al. (hereinafter, merely "Lawler"). Claims 53-56, 111 and 119 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Matthews in view of U.S. Patent No. 5,600,364 to Hendricks et al. (hereinafter, merely "Hendricks").

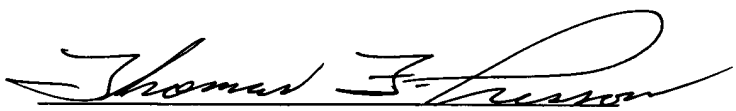
The present application is entitled to the Japanese priority filing date of July 20, 1995. This priority date antedates the August 21, 1995 U.S. filing date to which Matthews is entitled. Enclosed herewith is a verified English translation of Japanese application 07-183929,

from which it will be seen that claims 40-59 and 87-126 are fully supported by this Japanese priority application. In view of the earlier effective filing date of the present application, the Matthews reference is not available as prior art with respect hereto. It is, therefore, requested that this reference be removed and that the rejection of claims 40-59 and 87-126 be withdrawn. See MPEP 201.15.

It is respectfully submitted that the instant application is in condition for allowance; and an early notice to this effect is respectfully solicited.

Respectfully submitted,

FROMMER LAWRENCE & HAUG LLP
Attorneys for Applicants

By: 

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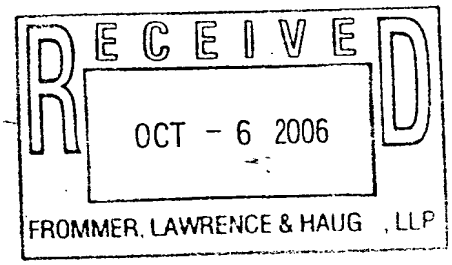

Re: Patent Application in U.S.A.
Your Ref.: 450100-3598.1
Sony File: S96P0565US01

Dear Mr.William S.Frommer

In response to the Office Action dated July 20, 2006, we prepared and send you the translation of JP07-183929
Would you please file it in US Patent Office as soon as possible.

We appreciate your cooperation in this matter.

Very truly yours,

Fumihiko Moriya Y.F

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Intellectual Property Division

FM:SP:YF

Encl.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Tomohisa SHIGA, Kanagawa, Japan;
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APPLICATION No.: 09/431,437 Group Art Unit: 2623
FILING DATE: November 1, 1999 Examiner: SALCE, JASON P.
TITLE: ELECTRONIC PROGRAM GUIDE SYSTEM USING IMAGES OF REDUCED SIZE TO IDENTIFY RESPECTIVE PROGRAMS

Hon. Commissioner of Patents and Trademarks,
Washington, D.C. 20231

SIR:

CERTIFIED TRANSLATION

I, Yuko OKANO, am an official translator of the Japanese language into the English language and I hereby certify that the attached comprises an accurate translation into English of Japanese Application No. 7-183929, filed on July 20, 1995.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United states Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

3rd October 2006
Date

Yuko OKano
Yuko OKANO

[Name of Document] Application for Patent

[Reference No.] S95048738

[Date of Filing] July 20, 1995

[Addressee] Commissioner of the Patent Office

[Int. Cl.] H04N 5/445

[Title of the Invention] ELECTRONIC PROGRAM GUIDE TRANSMITTING APPARATUS AND METHOD THEREFOR, ELECTRONIC PROGRAM GUIDE RECEIVING APPARATUS AND METHOD THEREFOR, AND ELECTRONIC PROGRAM GUIDE TRANSMITTING AND RECEIVING SYSTEM AND METHOD THEREFOR

[Number of Claims] 10

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[Application Fees]

[Prepayment Registration No.] 032089

[Amount of Payment] 21000

[List of Documents Attached]

[Name of Document] Specification 1

[Name of Document] Drawings 1

[Name of Document] Abstract 1

[No. of General Power of Attorney] 9102454

[Name of Document] SPECIFICATION

[Title of the Invention] ELECTRONIC PROGRAM GUIDE TRANSMITTING APPARATUS AND METHOD THEREFOR, ELECTRONIC PROGRAM GUIDE RECEIVING APPARATUS AND METHOD THEREFOR, AND ELECTRONIC PROGRAM GUIDE TRANSMITTING AND RECEIVING SYSTEM AND METHOD THEREFOR

[Claims]

[Claim 1] An electronic program guide transmitting apparatus comprising:

generation means for generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs that are broadcast on a plurality of broadcast channels; and

transmission means for transmitting the data representing the electronic program guide by superimposing the data on image data of the programs.

[Claim 2] An electronic program guide transmitting apparatus according to claim 1, wherein the data representing the electronic program guide further comprises at least one of a title, broadcast time and date, casts, and a description of content of the programs.

[Claim 3] An electronic program guide transmitting method comprising:

generating data representing an electronic program guide including reduced-size still pictures of typical

frames of programs that are broadcast on a plurality of broadcast channels; and

transmitting the data representing the electronic program guide by superimposing the data on image data of the programs.

[Claim 4] An electronic program guide receiving apparatus comprising:

receiving means for receiving data representing programs and data representing an electronic program guide including reduced-size still pictures of typical frames of the programs;

guide display operational means being operated when displaying the still pictures as the electronic program guide; and

selection means for selecting and outputting, when the guide display operational means is operated, the still picture so that the still picture is displayed by being superimposed on an image of the program.

[Claim 5] An electronic program guide receiving apparatus according to claim 4, wherein the data representing the electronic program guide comprises titles of the programs, and the selection means selects and outputs the title so that the title is superimposed on the still picture.

[Claim 6] An electronic program guide receiving apparatus according to claim 4, wherein the data representing the

electronic program guide comprises detailed information concerning broadcast time and date, casts, or a description of the content of the programs, the electronic program guide receiving apparatus further comprising detailed-information display operational means being operated when displaying the detailed information.

[Claim 7] An electronic program guide receiving apparatus according to claim 4, further comprising display means for displaying the programs or the electronic program guide received by the receiving means.

[Claim 8] An electronic program guide receiving method comprising:

receiving data representing programs and data representing an electronic program guide including reduced-size still pictures of typical frames of the programs; and

selecting, when an instruction is given to display the guide, the still picture as the electronic program guide and displaying the still picture so that the still picture is superimposed on an image of the program.

[Claim 9] An electronic program guide transmitting and receiving system comprising:

generation means for generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs that are broadcast on a plurality of broadcast channels;

transmission means for transmitting the data representing the electronic program guide by superimposing the data on image data of the programs;

receiving means for receiving the data representing the programs and the data representing the electronic program guide;

guide display operational means being operated when displaying the still pictures as the electronic program guide; and

selection means for selecting and outputting, when the guide display operational means is operated, the still picture so that the still picture is displayed by being superimposed on an image of the program.

[Claim 10] An electronic program guide transmitting and receiving method comprising:

generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs that are broadcast on a plurality of broadcast channels;

transmitting the data representing the electronic program guide by superimposing the data on image data of the programs;

receiving data representing the programs and the data representing the electronic program guide; and

selecting and displaying, when an instruction is given

to display the guide, the still picture as the electronic program guide so that that the still picture is superimposed on an image of the program.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to an electronic program guide transmitting apparatus and its transmitting method, an electronic program guide receiving apparatus and its receiving method, and an electronic program guide transmitting and receiving system and its transmitting and receiving system. More particularly, the invention relates to an electronic program guide transmitting apparatus and its transmitting method, an electronic program guide receiving apparatus and its receiving method, and an electronic program guide transmitting and receiving system and its transmitting and receiving method in which a desired program can be selected from a plurality of programs speedily and positively.

[0002]

[Description of the Related Art]

Systems for digitizing television signals and transmitting them via a satellite, such as a broadcast satellite or a communication satellite, and receiving them in households are coming into wide use. In such systems, approximately 80 broadcast channels can be ensured, and accordingly, a large number of programs can be broadcast.

[0003]

For example, PCT Japanese Translation Patent Publication No. 6-504165 discloses an electrical program guide (EPG) system in which broadcast channels are represented in columns and times are indicated in rows and the title of a program being broadcast is displayed in characters in the position at the corresponding channel and the corresponding time.

[0004]

[Problems to be Solved by the Invention]

In this type of EPG system, however, since the program titles are displayed in characters, they are difficult to recognize. This problem is more noticeable for Japanese characters than alphabetical letters, since the former have more strokes than the latter. It is thus difficult to select a desired program speedily and reliably.

[0005]

Accordingly, in view of the above background, it is an object of the present invention to select a desired program from a plurality of programs speedily and reliably.

[0006]

[Means for Solving the Problems]

The electronic program guide transmitting apparatus set forth in claim 1 includes: generation means for generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs

that are broadcast on a plurality of broadcast channels; and transmission means for transmitting the data representing the electronic program guide by superimposing the data on image data of the programs.

[0007]

The electronic program guide transmitting method set forth in claim 3 includes: generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs that are broadcast on a plurality of broadcast channels; and transmitting the data representing the electronic program guide by superimposing the data on image data of the programs.

[0008]

The electronic program guide receiving apparatus set forth in claim 4 includes: receiving means for receiving data representing programs and data representing an electronic program guide including reduced-size still pictures of typical frames of the programs; guide display operational means being operated when displaying the still pictures as the electronic program guide; and selection means for selecting and outputting, when the guide display operational means is operated, the still picture so that the still picture is displayed by being superimposed on an image of the program.

[0009]

The electronic program guide receiving method set forth in claim 8 includes: receiving data representing programs and data representing an electronic program guide including reduced-size still pictures of typical frames of the programs; and selecting, when an instruction is given to display the guide, the still picture as the electronic program guide and displaying the still picture so that the still picture is superimposed on an image of the program.

[0010]

The electronic program guide transmitting and receiving system set forth in claim 9 includes: generation means for generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs that are broadcast on a plurality of broadcast channels; transmission means for transmitting the data representing the electronic program guide by superimposing the data on image data of the programs; receiving means for receiving the data representing the programs and the data representing the electronic program guide; guide display operational means being operated when displaying the still pictures as the electronic program guide; and selection means for selecting and outputting, when the guide display operational means is operated, the still picture so that the still picture is displayed by being superimposed on an image of the program.

[0011]

The electronic program guide transmitting and receiving method set forth in claim 10 includes: generating data representing an electronic program guide including reduced-size still pictures of typical frames of programs that are broadcast on a plurality of broadcast channels; transmitting the data representing the electronic program guide by superimposing the data on image data of the programs; receiving data representing the programs and the data representing the electronic program guide; and selecting and displaying, when an instruction is given to display the guide, the still picture as the electronic program guide so that that the still picture is superimposed on an image of the program.

[0012]

[DESCRIPTION OF THE PREFERRED EMBODIMENTS]

Fig. 1 illustrates an example of the configuration of a transmission apparatus to which an electronic program guide transmission apparatus of the present invention is applied. This transmission apparatus has a switcher 301. Digital data representing video data and audio data supplied from broadcast stations in the United States, such as CNN, GAORA, Asahi, STAR, TRY, MTV, Special, Sport, BBC, CSNI, Green (trade names or service marks), etc., and broadcast stations in Japan, such as NHK, NTV, TBS, Fuji, TV Asahi, TV Tokyo,

WOWOW (trade names or service marks), etc. are input into the switcher 301.

[0013]

Further, digital video signals and audio signals played back from a digital videocassette recorder (DVCR) (not shown) are also input into the switcher 301.

[0014]

The switcher 301, controlled by a program-transmitting control device 308, selects a plurality of predetermined broadcast channels (a video signal and an audio signal are counted as a broadcast program) from the input video signals and audio signals and output them to a promotion-channel generating device 302.

[0015]

The switcher 301 selects five predetermined channels from the input signals and outputs them to an MPEG video/audio encoder block 303-1. Similarly, the switcher 301 also selects and outputs signals for the five channels into each of the MPEG video/audio encoder blocks 303-2 through 303-7.

[0016]

Predetermined video signals output from the switcher 301 are supplied to a JPEG encoder block 310 built in an EPG data generating device 309 (generating means).

[0017]

The promotion-channel generating device 302 independently processes signals of two predetermined channels among the input plurality of broadcast channels.

[0018]

Also, bit map data to be transmitted, such as icons, station logos, category logos, and so on, which are generated by the EPG data generating device 309 under control of the program-transmitting control device 308 (this data may have been stored in a below-mentioned IRD 2 shown in Fig. 20), are input into the promotion-channel generating device 302. The promotion-channel generating device 302 superimposes this bit map data on a video signal input from the switcher 301.

[0019]

The promotion-channel generating device 302 further outputs the processed data to a multiplexer (MUX) 304-1. A detailed explanation of the promotion-channel generating device 302 will be given below with reference to Fig. 2.

[0020]

The MPEG video/audio encoder blocks 303-1 to 303-7 each contain five MPEG video/audio encoders for five channels in order to encode video signals and audio signals of the respective five broadcast channels. Accordingly, the MPEG video/audio encoder blocks 303-1 to 303-7 respectively encode input video data and audio data and output them to

the corresponding multiplexers 304-2 to 304-8.

[0021]

The JPEG video encoder block 310 built into the EPG data generating device 309 selects predetermined typical frames from video signals input from the switcher 301, under an instruction from the program-transmitting control device 308. The encoder block 310 then reduces each frame into a smaller size and further compresses the frame data into first EPG data (EPG1) and outputs it to each of the multiplexers 304-1 through 304-8.

[0022]

Other EPG data (EPG2) generated by the EPG data generating device 309 are also supplied to the multiplexers 304-2 through 304-8. The EPG2 includes EPG data that primarily contains text for a comparatively short period. Third EPG data (EPG3) largely representing text for a period subsequent to the above-mentioned short period, as well as EPG2, are supplied to the multiplexer 304-1.

[0023]

The multiplexer 304-1 (transmission means) multiplexes EPG1 to EPG3 with video data and audio data input from the promotion-channel generating device 302 and outputs the multiplexed data to a digital modulation circuit 305-1. The multiplexers 304-2 through 304-8 (transmission means) multiplex EPG1 and EPG2 with video data and audio data input

from the MPEG video/audio encoder blocks 303-1 through 303-7, respectively, and output the multiplexed data to digital modulation circuits 305-2 through 305-8, respectively. The digital modulation circuits 305-1 through 305-8 perform digital-modulation on the input digital data according to a predetermined method (for example, QPSK method). Outputs of the digital modulation circuits 305-1 to 305-8 are allocated to respective satellite transponders (below-mentioned transponders 1 through 8 shown in Fig. 8).

[0024]

A synthesizer circuit 306 synthesizes the outputs of the digital modulation circuits 305-1 through 305-8 and transmits the resulting data to a satellite via an antenna 307.

[0025]

Fig. 2 illustrates an example of the configuration of the promotion-channel generating device 302. Data concerning one broadcast channel output from the switcher 301 is processed as a single frame by a single-frame generating device 332-1. An output of the single-frame generating device 332-1 is input into a superimposer 333-1, and is superimposed on data supplied from the EPG data generating device 309. An output of the superimposer 333-1 is output to an MPEG video/audio encoder 334-1.

[0026]

Likewise, data on the remaining broadcast channel output from the switcher 301 is singly processed by a single-frame generating device 332-2. The data is then input into a superimposer 333-2 and is superimposed on the data input from the EPG data generating device 309. The data output from the superimposer 333-2 is input into an MPEG video/audio encoder 334-2 and is encoded therein.

[0027]

The two items of audio data representing the two channels incorporated into the single-frame generating devices 332-1 and 332-2 are encoded in the MPEG video/audio encoders 334-1 and 334-2, respectively.

[0028]

The resulting items of data output from the MPEG video/audio encoder blocks 334-1 and 334-2 are multiplexed in a multiplexer 335 and are output to the multiplexer 304-1.

[0029]

The European standards of the digital video broadcasts transmitted to receivers (IRD2 shown in Fig. 20) installed in households via a satellite in the above-described manner have been summarized by Project Digital Video Broadcasting (DVB) formed of approximately 150 companies, mainly European broadcasters and manufacturers. This enables the receivers, in compliance with the standards, to produce frames of an electronic program guide from the EPG data transmitted as

described above and to display them on a monitor.

[0030]

The operation of the embodiment shown in Figs. 1 and 2 will now be explained. Under control of the program-transmitting control device 308, the switcher 301 selects signals for two channels to be broadcast for promotion and outputs the signals to the promotion-channel generating device 302.

[0031]

The data indicating one channel output from the switcher 301 is subjected to predetermined processing in the single-frame generating circuit 332-1 and is then input into the superimposer 333-1. The program of this single frame is targeted for presenting part of a predetermined program for promotion. Fig. 3 illustrates an example of a display for this promotion program.

[0032]

The superimposer 333-1 superimposes this video data on the data input from the EPG data generating device 309. In the example of a display shown in Fig. 3, characters, such as "promotion channel 1 NHK", representing the item name displayed on the top left, characters, such as "program introduction", representing the item description, and a logo ("NHK" in this embodiment) of the station broadcasting this program, are superimposed on the display (it should be noted

that the station logo will be not superimposed if it is stored in the IRD 2).

[0033]

The output of the superimposer 333-1 is input into the MPEG video/audio encoder 334-1 and is encoded according to an MPEG2 method.

[0034]

The data representing the remaining channel selected by the switcher 301 undergoes similar processing on a signal indicating the remaining channel selected by the switcher 301 by the single-frame generating device 332-2, the superimposer 333-2, and the MPEG video/audio encoder 334-2. As a result, two promotion channels for introducing the programs in the single frames are generated.

[0035]

The multiplexer 335 multiplexes the items of the promotion channel data formed of two single frames that are output from the MPEG video/audio encoder blocks 334-1 and 334-2 and outputs the multiplexed data to the multiplexer 304-1.

[0036]

The multiplexer 304-1 multiplexes the data input from the promotion-channel generating device 302 with the EPG data (EPG1 through EPG3) input from the EPG data generating device 309. The multiplexer 304-1 further forms the

resulting data into a packet and outputs it. The digital modulation device 305-1 performs digital-modulation on the data input from the multiplexer 304-1. The modulated data is then allocated to a satellite guide transponder (transponder 1 shown in Fig. 12).

[0037]

Meanwhile, the MPEG video/audio encoder block 303-1 encodes video data and audio data for five broadcast channels input from the switcher 301 and outputs the respective coded data to the multiplexer 304-2. The multiplexer 304-2 forms the data for five broadcast channels and the EPG data (EPG1 and EPG2) into packets and multiplexes them. The resulting data is output to the digital modulation circuit 305-2. The digital modulation circuit 305-2 performs digital modulation on the data input from the multiplexer 304-2. The modulated data is allocated to a first transponder (transponder 2 illustrated in Fig. 12) among normal transponders.

[0038]

Similarly, the multiplexers 304-3 through 304-8 form data for five broadcast channels encoded by each of the MPEG video/audio encoder blocks 303-2 through 303-7 and the EPG data (EPG1 and EPG2) into packets and multiplex them. The resulting items of data are input into the corresponding digital modulation circuits 305-3 through 305-8. The

modulated items of data are allocated to the remaining six transponders (transponders 3 through 8 shown in Fig. 12).

[0039]

The synthesizer circuit 306 combines the data output from the digital modulation circuits 305-1 to 305-8 and outputs the combined data to a satellite via the antenna 307. The satellite processes this data by use of the eight transponders and transmits the processed data to the corresponding receivers (IRD 2).

[0040]

An explanation will now be given of the EPG data (EPG1 through EPG3). In this embodiment, as will be described in a greater detail below, when a program-table button switch 144 of a remote commander 5 (Fig. 24) is manipulated, a data-stream frame is superimposed on an ordinary screen and displayed on a monitor 4 (Fig. 20), as illustrated in Fig. 4. This data stream is formed of a title bar and a program window, as illustrated in Figs. 5 and 6, respectively.

[0041]

As shown in Fig. 5, a category icon representing the category of a program is displayed at the leftmost portion of the title bar. A station logo as the symbol of the station broadcasting the program is displayed next to the category icon, and the title of the program is displayed next to the station logo.

[0042]

In this embodiment, the program window is formed of still pictures obtained by reducing the size of the typical frames of five broadcast channels, as shown in Fig. 6. A category icon representing the category of the program is displayed on each reduced-size frame.

[0043]

Further, an information button switch 145 (Fig. 24) of the remote commander 5 is manipulated, whereby an information screen for further illustrating the program in detail is displayed, as shown in Fig. 7. The title bar, as well as the data stream shown in Fig. 4, is displayed on the uppermost position of this information screen.

[0044]

The reduced-size frame of a typical still picture is displayed at the bottom left of the title bar. The broadcast date and the casts (characters) of this program are displayed at the right of the reduced-size frame. A synopsis of this program is displayed at the bottom of the reduced-size frame and the broadcast date and the casts.

[0045]

EPG1 represents still-picture data forming the program window shown in Fig. 6, while EPG2 and EPG3 indicate data concerning the title, broadcast date, casts, and the synopsis of the program. EPG2 is concerned with programs to

be broadcast from the current time to the near future, while EPG3 relates to programs to be broadcast in the distant future. EPG1 through EPG3 are displayed as OSD.

[0046]

Figs. 8 through 10 illustrate display examples of an electronic program guide displayed by a receiver (IRD2 shown in Fig. 29) that is able to primarily process only characters (letters) as OSD (in other words, unable to process still pictures) and display them.

[0047]

Fig. 8 illustrates an electronic program guide for all the channels (entire program table) in which the names of broadcast stations are shown in columns and times are indicated in rows. At the position defined by the corresponding column and row, the title of the program to be broadcast by the broadcast station and time is displayed.

[0048]

Fig. 9 illustrates a display example of an electronic program guide (channel program table) of a station. In this example, the titles and the broadcast start time of the programs on the channel are displayed in the direction from top to bottom.

[0049]

The entire program table shown in Fig. 8 and the channel program table illustrated in Fig. 9 are minimum

information (brief explanation for the program) required for selecting a desired program. In contrast, as shown in Fig. 10, the information (detailed explanation for the program) for commenting on a predetermined program (or a predetermined broadcast station or broadcast channel) is not essential but can be used as a reference for selecting the program. Accordingly, the detailed program explanation is also transmitted as EPG data.

[0050]

If both the program table (brief program explanation) and the program content (detailed program explanation) are transmitted from the individual transponders for a long period, the transmission rate of video data and audio data, which should be transmitted, is hampered. Accordingly, as shown in Fig. 11(A), program table data containing a maximum of 80 broadcast channels for a 24-hour period and program-content data concerning programs currently being broadcast as well as the subsequent program for 80 broadcast channels are transmitted to the transponders (multiplexers 304-2 to 304-8) of the channels for transmitting normal programs as EPG2 transmitted from the EPG data generating device 309. The above-mentioned 80 channels are calculated assuming that 10 channels are assigned to each transponder, and 8 transponders are allocated to one satellite. In the embodiment shown in Fig. 1, however, 37 channels (=5×7+2)

are shown.

[0051]

This can prevent the transmission rate of video signals and audio data, which should be transmitted, from being decreased.

[0052]

The transmission channel (the channel corresponding to the digital modulation circuit 305-1) of the promotion-channel generating device 302 is used largely (preferentially) for transmitting promotion-oriented programs, such as introductions for programs broadcast on other transmission channels (transmission channels corresponding to the digital modulation circuits 305-2 to 305-8), recommended programs, commercials for sponsors, etc. Accordingly, the transponder (guide transponder) for transmitting information concerning the promotion channel transmits very few normal programs if any at all, unlike the normal transponders, and is thus able to transmit a greater amount of program-table data and program-content data.

[0053]

Hence, in this promotion channel, program-table data and program-content data covering a longer period are transmitted, as shown in Fig. 11(B), as EPG3 from the EPG data generating device 309 to this promotion channel. In this embodiment, the program-table data includes data for

150 hours, while the program-content data includes data for 70 hours.

[0054]

Accordingly, as illustrated in Fig. 12, program-table data for 150 hours and program-content data for 70 hours of the individual 80 broadcast channels are transmitted to the guide transponder (transponder 1).

[0055]

In contrast, program-table data for 24 hours and program-content data representing current and subsequent programs on the 80 broadcast channels are transmitted to normal transponders (transponders 2 to 8).

[0056]

Since still-picture data (data stream) is essential for selecting the program, as shown in Fig. 11, the still-picture data for 24 hours (EPG1-2) is transmitted to the normal transponders and the data for 150 hours (EPG1-2 and EPG1-3) is transmitted to the guide transponder, as well as the program table (brief program explanation).

[0057]

The EPG data will now be described in detail. The EPG data, as well as other types of accessory data, is transmitted in a DVB system as one type of service information (SI). Data required for producing an electronic program table from this EPG data is shown in Fig. 13.

[0058]

The service provider for specifying a provider for providing a service (broadcast channel), the service name representing the name of the service, the service type indicating the type of service are described in SDT (Service Description Table) in the EPG data. In this service type, a description is given whether the type of service is a single frame (promotion_service).

[0059]

The title of the program is defined as event_name of the Short Event Descriptor of EIT (Event Information Table). The subtitle (type) is described in Component Descriptor of the EIT.

[0060]

The current time and date is defined as UTC_time in TDT (Time and Date Table).

[0061]

The program start time is described as start_time of the EIT. The program duration is described as duration of the EIT.

[0062]

Further, for programs for people only over a certain age, the Parental Rate specifying the age is described in Parental Rating Descriptor of the EIT.

[0063]

The video mode is described in Component Descriptor of the EIT. The provide language is described in language Descriptor of ISO639 of the PMT. The provide sound mode is described in Component Descriptor of the EIT.

[0064]

The category is described in Content Descriptor of the EIT.

[0065]

The brief program explanation, such as the casts shown in Fig. 7, and the entire program table and the channel program table illustrated in Figs. 8 and 9, respectively, are described in the Short Event Descriptor of the EIT. The detailed program explanation, such as the content explanation shown in Fig. 7 and the program information shown in Fig. 10, is described in the Extended Event Descriptor of the EIT.

[0066]

Moreover, promotion information, such as the item name (promotion channel 1 NHK), the item content (program introduction), and the station logo (NHK) (if it is transmitted), discussed as shown in Fig. 3, is described in Promotion Descriptor of the SDT.

[0067]

Fig. 14 illustrates the configuration of the SDT. The SDT includes data representing the services in the system,

such as the service name, the service provider, etc. The number in parentheses in Fig. 14 represents the number of bytes.

[0068]

The leading 10 bytes are used as a header that is formed of common structure 1(3), transport stream ID (transport_stream_ id(2)), common structure 2(3), and original network ID (original_network_id(2)). The transport stream ID provides a label for distinguishing the transport stream to which the information is given from the SDT from the other transport streams multiplexed in the same delivery system.

[0069]

The original network ID is a label for identifying the network ID serving as the generation source of the delivery system.

[0070]

Subsequent to the header, service descriptors loop [0] to service descriptors loop [N] are disposed, and finally, error-correcting CRC_32(4) is located.

[0071]

Each service descriptors loop includes service_id(2), EIT_schedule_flag, EIT_present/following_flag, running_status, and free_CA_mode.

[0072]

The service_id provides a label for distinguishing the service from the other services in the same transport stream. The service_id is equivalent to the program number (program_number) in the corresponding program map section (program_map_section).

[0073]

The EIT_schedule_flag indicates the presence or the absence of the EIT_schedule information in its own transport stream.

[0074]

The EIT_present/following_flag represents the presence or the absence of the EIT_present/following information in its own transport stream.

[0075]

The running_status designates the status of the service, such as whether the service has not yet started, is beginning to start in a few minutes (required for setting up a VCR for recording), has already started, or is currently suspended.

[0076]

The free_CA_mode indicates whether the service can be accessed free of charge or is controlled by a conditional access system.

[0077]

Subsequent to the free_CA_mode, the

descriptor_loop_length is disposed. The descriptor_loop_length designates the overall byte length of subsequent descriptors.

[0078]

The adjacent service_descriptor[i] supplies, together with the service_type, the name of service_provider (service provider) and the service name in text format.

[0079]

Subsequently, the country_availability_descriptor[i] represents a list of the countries that can access the service and a list of the countries that cannot access it. The country_availability_descriptor[i] can be inserted at a maximum of twice.

[0080]

Subsequently, descriptors are disposed and include the above-described promotion descriptor.

[0081]

Fig. 15 illustrates the configuration of the EIT. The leading 10 bytes are used for the header that contains common structure 1(3), service_id(2), common structure 2(3), and transport_stream_id(2).

[0082]

Subsequently, original_network_id(2) is located, and then, last_table_id(1) is positioned. The last-table-id(1) identifies the final (=maximum) table_id. If only the

single table is used, the table_id of that table is set. If table-id takes consecutive values, the information is stored in chronological order. Thereafter, event descriptors loop[0] to event descriptors loop[N] are disposed, and finally, CRC_32(4) is provided.

[0083]

Event descriptors each include event_id(2) providing the identification number of an event to be described, and start_time (5) for displaying the start time of the event in the form of UTC and MJD. In this field, 16 LSB of the MJD-displayed data is provided, and six digits for subsequent 24 bits are represented by use of 4-bit BCD. For example, 93/10/12 12:45:00 can be coded as 0XC078124500.

[0084]

The following duration (3) represents the duration of the event (program) by hour, minute and second.

[0085]

Thereafter, the running_status is disposed, and the free_CA_mode is then disposed.

[0086]

Subsequently, the descriptor_loop_length (1.5) is arranged. Then, the Short_event_descriptor[i](7+α) is disposed, and provides the event name and short description of the event (program table) in the text format.

[0087]

The following Extended_event_descriptor[i](11+α) provides a more detailed description of the event (program content) than the description supplied by the Short event descriptor.

[0088]

Further, the audio_component_descriptor[i](6), video_component_descriptor[i](3), and subtitle_component_descriptor[i](6) are described.

[0089]

The subsequent CA-identifier_descriptor[i](4) describes whether an event is scrambled, whether restricted reception, such as charged reception, is conditioned, and so on.

[0090]

Finally, the other descriptors, such as event_still_image_desciptor[i] for recording the data of the program window (still-picture data) shown in Fig. 6, are described.

[0091]

Fig. 16 illustrates the format of this event_still_image_descriptor[i] (still-picture format). As shown in Fig. 16, the 8-bit descriptor-tag indicating that this type of information is still-picture data is disposed as the leading data. Then, 8-bit descriptor_length indicating the overall format length is provided.

[0092]

After the descriptor_length, the 8-bit descriptor-number and 8-bit last-descriptor-number indicating the number of the descriptor and the last (maximum) descriptor, respectively, are sequentially disposed.

[0093]

Finally, image_structure as substantial image data of still pictures is positioned. This image_structure is formed of 8-bit format_identifier, and 32-bit image_size and image_data.

[0094]

The format_identifier represents the ID of the image_data. When the format_identifier is 0x10, image_data is identified as black-and-white binary image data. If the format_identifier is 0x11, image_data is determined as black-and-white 256-step image data. If the format_identifier is 0x12, image_data is set as RGB image data, each color being formed of 8 bits. When the format_identifier is 0x20, image_data is identified as image data compressed by a JPEG method. In the embodiment shown in Fig. 1, the reduced-size frame forming the program window is compressed by a JPEG method, the format_identifier results in 0x20.

[0095]

When the image_data is binary black-and-white image data, it sometimes cannot be divided by 8 bits, in which

case, dummy data is stuffed.

[0096]

The image_size represents the size of the image_data.

[0097]

Fig. 17 illustrates the configuration of the TDT. The TDT is formed of common structure 1(3) and UTC_time(5).

[0098]

In addition to the above-described tables, the SI includes PAT (Program Association Table) shown in Fig. 18 and PMT (Program Map Table) illustrated in Fig. 19.

[0099]

The PAT includes, as shown in Fig. 18, not only common structure 1(3), transport_stream_id(2), common structure 2(3), but also program_map_id_loop[0](4) to program_map_id_loop[N](4), and finally CRC_32(4).

[0100]

Each program_map_id_loop[i](4) includes program_number[i](2) and program_map_PID[i](2) (or network_PID).

[0101]

The program_number represents a program to render the corresponding program_map_PID effective. When the program_number is set to be 0x0000, the PID to be subsequently referred serves as network_PID. The values of the program_number other than 0x0000 are defined by the user.

In this field, the same value can never be taken in 1 version of the PAT. For example, the program_number is used for specifying a broadcast channel.

[0102]

The network_PID defines the PID of a transport stream packet including NIT (Network Information Table). Although the value of the network_PID can be defined by the user (0x0010 in the DVP), it cannot take a value reserved for another use. The presence or the absence of the network_PID is optional.

[0103]

The program_map_PID defines the PID of a transport stream packet containing the effective PMT for the program defined by the program_number. Two or more program_map_PID cannot be allocated to the program_number. Although the value of the program_map_PID can be specified by the user, it cannot take a value reserved for another use.

[0104]

As shown in Fig. 19, a 10-byte header formed of common structure 1(3), program_number(2), common structure 2(3), and PCR_PID (1.375) is first positioned at the PMT. The PCR_PID indicates the PID of a transport stream packet including a PCR field effective for the program defined by the program_number. If there is no PCR related to the defined program with respect to the privade stream, this

field takes the value of 0x1FFF.

[0105]

Subsequently, program_info_length (1.5) is located to specify the byte number of the following descriptor.

[0106]

In the subsequent program info descriptors, CA_descriptor, Copyright_descriptor, Max_bitrate_descriptor, etc. are described.

[0107]

Then, stream type loop[0](5+α) to stream type loop[N](5+α), and CRC_32(4) are disposed.

[0108]

Each stream type loop has stream_type(1) and elementary_PID(2). The stream_type defines the type of payload or the elementary stream transmitted in a packet having a PID specified by the elementary_PID. The value of the stream_type is defined by MPEG2.

[0109]

The elementary_stream-PID specifies the PID of the related elementary stream and the PID of a transport stream packet that transmits data.

[0110]

Subsequent to the elementary_PID, 12-bit ES_info_length(1.5) is positioned: the first two bits are 00, and immediately after this field, the byte number of the

descriptor of the following related elementary stream is defined.

[0111]

Then, ES info descriptors[N] is defined. In ES info descriptors[N], CA_descriptor and other descriptors are described.

[0112]

Fig. 20 illustrates an example of the configuration of an AV (Audio Video) system to which the present invention is applied. In this embodiment, an AV system 1 is formed of an IRD (Integrated Receiver/Decoder) 2 and a monitor 4. The IRD 2 decodes a signal obtained by receiving radio waves transmitted from the transmitting apparatus shown in Fig. 1 by a parabolic antenna 3 via a satellite (broadcasting satellite or communication satellite) (not shown). The monitor 4 and the IRD 2 are interconnected to each other through an AV line 11 and a control line 12.

[0113]

Commands can be input into the IRD 2 by transmitting an infrared ray (IR) signal from a remote commander 5. More specifically, a predetermined button switch of the remote commander 5 is manipulated, whereby a corresponding IR signal is transmitted from an IR-transmitting section 51 and is sent to an IR-receiving section 39 of the IRD 2 (Fig. 23).

[0114]

Fig. 21 illustrates the state of an electrical connection of the AV system shown in Fig. 20. The parabolic antenna 3 has a LNB (Low Noise Block downconverter) 3a so as to convert a signal from a satellite into a signal having a predetermined frequency and to supply it to the IRD 2. The IRD 2 then supplies its output to the monitor (display means) 4 via the AV line 11 formed of, for example, three lines, such as a composite video signal line, an audio L signal line, and an audio R signal line.

[0115]

Further, the IRD 2 and the monitor 4 have AV-machine control signal transmitting/receiving sections 2A and 4A, respectively. The transmitting/receiving sections 2A and 4A are interconnected to each other by the control line 12 formed of a wired SIRCS (Wired Sony Infrared Remote Control System).

[0116]

Fig. 22 is a front view illustrating an example of the configuration of the IRD 2. A power-supply button switch 111 is disposed at the left corner of the IRD 2. This button switch 11 can be manipulated by turning power supply on or off. When the power is turned on, an LED 112 is lit. An LED 113 located adjacent to the LED 112 in the right direction can be manipulated by pressing a TV/DSS changeover button switch 123. More specifically, the LED 113 is lit

when a DSS mode is set, while it is turned off when the TV mode is set. The DSS (Digital Satellite System) mode is used for receiving radio waves transmitted via a satellite according to the above-described method, while the TV mode is used for receiving ground waves of television broadcasts.

[0117]

An LED 114 is lit when a predetermined message is transmitted to the IRD 2 via a satellite. When the user outputs and displays this message onto the monitor 4 and checks it, the LED 114 is turned off.

[0118]

A menu button switch 121 is manipulated when menus are displayed on the monitor 4. An exit button switch 122 is pressed when OSD data is erased.

[0119]

An up button switch 117, a down button switch 118, a left button switch 119 and a right button switch 120 are disposed around a select button switch 116 in the upper, lower, left and right directions, respectively. The up button switch 117, the down button switch 118, the left button switch 119, and the right button switch 120 are manipulated when the cursor is moved in the upper, lower, left and right directions, respectively. The select button switch 116 is pressed when the selection is set.

[0120]

Fig. 23 is an example of the internal configuration of the IRD 2 when receiving signals in the above-described DSS mode. An RF signal output from the LNB 3a of the parabolic antenna 3 is supplied to a tuner 21 of a front end (receiving means) 20 and is demodulated. An output of the tuner 21 is supplied to a QPSK demodulation circuit 22 and is QPSK-demodulated therein. An output of the QPSK demodulation circuit 22 is supplied to an error-correcting circuit 23 in which errors are detected and corrected as required.

[0121]

A key required for a deciphering operation, as well as a decipher program, is stored in a CAM (Conditional Access Module) 33 formed of an IC card having a CPU, ROM, RAM, and so on. When a signal transmitted via a satellite is ciphered, a key and decipher processing are required. Accordingly, the key is read from the CAM 33 via a card reader interface 32 and is supplied to a demultiplexer 24. The demultiplexer 24 deciphers the ciphered signal with the use of this key.

[0122]

The CAM 33 stores payment information in addition to the key and the decipher program required for the deciphering operation.

[0123]

The demultiplexer 24 receives a signal output from the error-correcting circuit 23 of the front end 20 and temporarily stores the signal in a data buffer memory (DRAM (Dynamic Random Access Memory) or a SRAM (Static Random Access Memory) 35. The demultiplexer 24 reads the signal as required and supplies the ciphered video signal to an MPEG video decoder 25. The ciphered audio signal is then supplied to an MPEG audio decoder 26.

[0124]

The MPEG video decoder 25 (selection means) stores an input digital video signal in a DRAM 25a as required and performs a decoding operation on a video signal compressed according to the MPEG method. The decoded video signal is supplied to an NTSC encoder 27 and is converted into a luminance signal (Y), a chroma signal (C) and a composite signal (V) according to the NTSC method. The luminance signal and the chroma signal are output as an S video signal through buffer amplifiers 28Y and 28C, respectively. The composite signal is output through a buffer amplifier 28V.

[0125]

As the MPEG video decoder 25, MPEG2 decoding LSI (STi3500) manufactured by SGS-Thomson Microelectronics Ltd. may be used. The outline of this product is introduced in, for example, *Nikkei Electronics*, Nikkei Business Publications, Inc. March 14, 1994 (no. 603), pages 101 to

110, by Mr. Martin Bolton.

[0126]

Further, the MPEG2-Transportstream is explained in *Saishin MPEG Kyokasho* (*Latest MPEG Textbook*), ASCII Corporation, August 1, 1994, pages 231 to 253.

[0127]

The MPEG audio decoder 26 stores the digital audio signal supplied from the demultiplexer 24 in a DRAM 26a as required and performs a decoding operation on the audio signal compressed according to an MPEG method. The decoded audio signal is D/A-converted in a D/A converter 30; an audio signal component on the left channel is output via a buffer amplifier 31L, while an audio signal component on the right channel is output via a buffer amplifier 31R.

[0128]

An RF modulator 41 converts the composite signal output from the NTSC encoder 27 and the audio signal output from the D/A converter 30 into an RF signal and outputs it. Moreover, when the TV mode is set, the RF modulator 41 allows the RF signal of the NTSC method input from an AV machine, such as a cable box or the like, to pass through the modulator 41 and to be directly output to a VCR or another AV machine (neither of them is shown).

[0129]

In this embodiment, the video signal and the audio

signal are supplied to the monitor 4.

[0130]

A CPU (Central Processing Unit) 29 executes various types of processing according to a program stored in a ROM 37. For example, the CPU 29 controls the tuner 21, the QPSK demodulation circuit 22, the error-correcting circuit 23 and so on. Additionally, the CPU 29 controls the AV-machine control signal transmitting/receiving section 2A to transmit a predetermined control signal to another AV machine (the monitor 4 in this embodiment) and receives a control signal from another AV machine via the control line 12.

[0131]

The operational button switches on a front panel 40 (Fig. 22) can be pressed to directly input a predetermined command to the CPU 29. Also, when the remote commander 5 (Fig. 24) is manipulated, an infrared-ray signal is emitted from the IR-transmitting section 51. The IR signal sent from the IR-transmitting section 51 is received by the IR-receiving section 39, and the receiving results are supplied to the CPU 29. In this manner, a predetermined command can also be input to the CPU 29 by manipulating the remote commander 5.

[0132]

The demultiplexer 24 captures EPG data, as well as the MPEG video data and audio data supplied from a front end 20,

and supplies the captured data to an EPG area 35A of the data buffer memory 35 and stores it therein. The EPG information includes information concerning the programs of the individual channels (for example, channels, broadcast time, titles and categories of the programs, in addition to still pictures of the programs) for 24 hours from the current time (EPG2 and EPG1-2) or the program of the individual channels for 150 hours from the current time (EPG2, EPG3, EPG1-2 and EPG1-3). This EPG information is frequently transmitted to the EPG area 35A, and thus, the latest EPG can always be stored in the area 35A.

[0133]

An electrically erasable programmable read only memory (EEPROM) 38 stores data that is preferably stored as required even after the power is turned off (for example, the history for the last four weeks received by the tuner 21, the channel number (last channel) received immediately before the power is off). Then, when the power is turned on, for example, the same channel as the last channel is received again. If the last channel is not stored, the channel stored as a default in the ROM 37 is received.

[0134]

Also, even when the power is off, the CPU 29 renders a minimum set of circuits, such as the front end 20, the demultiplexer 24, the data buffer memory 35 and the like,

operable if the sleep mode is set. The CPU 29 then counts the current time from the time information contained in the receiving signal and exercises control in such a manner that the circuits are operable at a predetermined time. For example, the CPU 29 performs automatic recording by use of the timer in cooperation with an external VCR.

[0135]

Further, when it is desired that predetermined OSD (On-Screen Display) data is generated, the CPU 29 controls the MPEG video decoder 25. In response to such control, the MPEG video decoder 25 generates the predetermined OSD data and writes it into an OSD area 25aA (Fig. 28) of the DRAM 25a and further reads and outputs it, whereby predetermined characters, graphics, images, etc. (for example, the characters, station logos, category icons, still pictures of the program window, which are superimposed on the ordinary screen, as shown in Figs. 3 through 10) can be output and displayed onto the monitor 4 as required.

[0136]

An SRAM 36 is used as a work memory of the CPU 29. A modem 34 transmits and receives data via a telephone line under control of the CPU 29.

[0137]

Fig. 24 is an example of the configuration of the button switches of the remote commander 5. A select button

(set key) switch 131 can be pressed (selected) perpendicularly relative to the top surface of the remote commander 5. An up button switch (upper key) 135, a down button switch (lower key) 136, a left button switch (left key) 137, and a right button switch (right key) 138 are used when the cursor is shifted in the upward, downward, left and right directions, respectively. A menu button switch 134 is pressed when a menu screen is displayed on the monitor 4.

[0138]

A channel up-and-down button switch 133 is used when the channel number to be received is increased or decreased. A volume-button switch 132 is used when the volume is increased or decreased.

[0139]

Ten-key numerical pad switches 138 indicating numbers 0 when 9 are used when numbers displayed are input. A channel-selection button switch 158 is sequentially pressed when the operation of the numerical pad button switch 138 is completed, indicating that the input of numbers has finished and the input number indicates the channel number. A promotion-channel button switch 157 is manipulated when a promotion channel is selected. A program-table button switch 144 (guide-display operational means) 144 is pressed when, for example, the data stream shown in Fig. 4, is displayed. An information button switch 145 (detailed-

information display operational means) is manipulated when, for example, the information screen illustrated in Fig. 7, is displayed.

[0140]

An input-changeover button switch 154 is pressed when the input into the IRD 2 is changed. When a mute button switch 151 is pressed, sound is muted, and when the button switch 151 is pressed again, the mute is released. A television on/off button switch 152 and a power on/off button switch 153 are manipulated when the power of the monitor (television receiver) 4 and the IRD 2, respectively, are turned on or off.

[0141]

Fig. 25 is another example of the arrangement of the button switches. In this embodiment, the select button switch 131 is disposed on the lower right of the up button switch 135 through the right button switch 138.

[0142]

Fig. 26 is an example of the internal configuration of the remote commander 5. A CPU 72 forming a microcomputer 71 always scans a button switch matrix 82 and detects the operations of the various types of button switches located on the remote commander 5 shown in Fig. 24.

[0143]

The CPU 72 executes various types of processing based

on a program stored in a ROM 73 and stores necessary data in a RAM 74 as required.

[0144]

The CPU 72 drives an LED 76 through an LED driver 75 to output an IR signal.

[0145]

Fig. 27 schematically illustrates the state in which video data, audio data and SI data (including EPG data) are formed into packets and transmitted, and then demodulated in the IRD 2. In the transmitting encoder, as shown in Fig. 27, the SI data, video data and audio data are formed into packets and are transmitted to BSS-band high-output transponders having frequencies from 12.25 GHz to 12.75 GHz loaded with a satellite. More specifically, packets of a plurality of (at a maximum of 10) channels are multiplexed and transmitted onto a signal having a predetermined frequency allocated to each transponder. Namely, each transponder transmits signals of a plurality of broadcast channels by use of a carrier wave (transmission channel). Accordingly, if there are 23 transponders, for example, data concerning a maximum number of 230 (=10×23) broadcast channels can be transmitted.

[0146]

In the IRD 2, the front end 20 receives a carrier wave having a frequency corresponding to a predetermined

transponder and demodulates the carrier wave. Consequently, the packet data indicating a maximum number of 10 (5 channels in this embodiment) broadcast channels can be obtained. The demultiplexer 24 then temporarily stores the packets obtained from the demodulated output of the front end 20 in the data buffer memory 35 and reads the packets therefrom. Data portions other than the header of each SI packet including the EPG data are stored in the EPG area 35A. Video packets are stored in the DRAM 25a and are then decoded in the MPEG video decoder 25. Audio packets are stored in the DRAM 26a and are then decoded in the MPEG audio decoder 26.

[0147]

Scheduling is arranged so that the transmission rates of the transponders can be the same. The transmission rate per carrier wave allocated to each transponder is 30 Mbits/second.

[0148]

For example, MPEG video data having images with rapid motion, such as a sport program, possesses a large number of packets. Accordingly, the number of programs with rapid motion that can be transmitted via a transponder is inevitably smaller.

[0149]

In contrast, MPEG video data having images with less

motion, such as announcement of a news program, can be transmitted in a fewer number of the packets. Accordingly, the number of programs with less motion that can be transmitted via a transponder is larger.

[0150]

Fig. 28 schematically illustrates data processing for displaying a frame of a program table on the monitor 4.

[0151]

The CPU 29 sets the transfer destinations of data input from the front end 20 in registers 24a built into the demultiplexer 24. The data supplied from the front end 20 is temporarily stored in the data buffer memory 35, and is then read to the demultiplexer 24 and transferred to the destinations set in the registers 24a.

[0152]

Referring to the header added to each packet, the demultiplexer 24 transfers MPEG video data and MPEG audio data to the MPEG video decoder 25 and the MPEG audio decoder 26, respectively. If the PID (packet ID) included in the header is SDT or EIT, EPG data (SI data) is stored in a predetermined address of the EPG area 35A set in the register 24a.

[0153]

The header is no longer required upon completion of this data transfer and is thus discarded.

[0154]

In this manner, when radio waves are received from a normal transponder (any transponder other than the promotion-channel guide transponder), reduced-size still-picture data and brief program explanation data (program table) for 80 (37) broadcast channels for 24 hours from the current time, and detailed program explanation data (program content) concerning the current program and the subsequent program for 80 channels, are captured into the EPG area 35A. The EPG data can be received from any normal transponder. Namely, the same EPG data is transmitted from any normal transponder.

[0155]

In contrast, when radio waves are received from the guide transponder (when the promotion channel is received), reduced-size still-picture data and the brief program explanation data for 80 (37) channels for 150 hours from the current time, and detailed program explanation data for 70 hours from the current time are captured into the EPG area 35A.

[0156]

The CPU 29 reads for a predetermined duration (the current time in the example illustrated in Fig. 4, and for approximately 4 hours from the current time in the example illustrated in Fig. 8) program data on the broadcast

channels (for example, 5 broadcast channels in the example shown in Fig. 4, and 15 channels in the example shown in Fig. 8) in a predetermined display zone 250 of an entire EPG table 240 from the EPG area 35A and writes the read program data into the OSD area 25aA of the DRAM 25a as bit map data. Then, the MPEG video decoder 25 reads the bit map data from the OSD area 25aA and outputs it to the monitor 4, whereby the EPG data, such as the reduced-size still pictures (Fig. 4) and the entire program table (Fig. 8), can be displayed on the monitor 4.

[0157]

The MPEG video decoder 25 can also decode image data compressed according to the JPEG method. However, the decoder 25 can decode the image data only in its original size. Accordingly, the CPU 29 incorporates the decoded still-picture data and converts it to the reduced-size frame, and then outputs the converted data to the MPEG video decoder 25. The data can be displayed as the reduced-size frame by use of the OSD function of the MPEG video decoder 25.

[0158]

When characters are displayed as OSD data, the character data stored in the EPG area 35A is compressed and should thus be decompressed by the use of a dictionary. For performing this expansion operation, a compressed-code

conversion dictionary is stored in the ROM 37.

[0159]

A mapping table (address conversion table) representing the relationship between the character codes and the stored positions of the bit map data of the fonts is also stored in the ROM 37. By referring to this mapping table, the bit map data corresponding to a predetermined character code can be read and written into the OSD area 25aA. The bit map data itself is also stored in a predetermined address of the ROM 37.

[0160]

Further, when logo data is not transmitted, not only logo data (data on the various types of logos including category logo and station logo) for displaying logos is stored in the ROM 37, but also the logo ID and the address conversion table for reading the logo data (bit map data) corresponding to the ID are stored as well. When the logo ID is identified, the logo data stored in the address corresponding to its ID is read and written into the OSD area 25aA, whereby the logo representing the category of the program can be displayed on the monitor 4. In other words, when logo data is transmitted, it is superimposed by the superimposers 333-1 through 333-4. If logo data transmitted from the transmitting end is interrupted deliberately, the ID is transmitted, and the bit map data corresponding to its

ID is read from the ROM 37.

[0161]

In this manner, when the program-table button switch 144 of the remote commander 5 is manipulated while a normal program is received and displayed on the monitor 4, a data stream formed of five reduced-size frames is displayed on the screen of the monitor 4, as shown in Fig. 4. A cursor is also displayed on a predetermined reduced-size frame of the data stream. By pressing the left button switch 137 or the right button switch 138, the cursor can be shifted in the left or right direction, respectively. For simpler representation of the entire frame, the category icon displayed on the reduced-size frame specified by the cursor is eliminated. At the same time, the category icon, station logo and title of the program defined by the cursor are displayed in the title bar.

[0162]

When the user further presses the select button 131, the CPU 29 controls the tuner 21 so that the program defined by the cursor can be received. This makes it possible to display the selected program with its enlarged size (original size) on the monitor 4.

[0163]

When the information button switch 145 of the remote commander 5 is pressed while the data stream is displayed,

as illustrated in Fig. 4, more detailed information (information frame) concerning the program selected by the cursor can be displayed, as shown in Fig. 7. More specifically, the still picture can be displayed in a greater size than the picture shown in Fig. 4 while the category icon, station logo and title are displayed in the title bar. The broadcast time and date, casts, and synopsis are also displayed. Then, the user can understand an overview of the program by referring to the display.

[0164]

When the user presses the select button switch 131 while the information frame such as shown in Fig. 7 is displayed, the program is received and displayed.

[0165]

The above-described operation is performed when the IRD 2 has a function of processing still pictures. If, however, the IRD 2 is constructed as shown in Fig. 29 (if the IRD 2 does not possess a function of processing still pictures but has a function of largely processing characters only), the entire program table shown in Fig. 8 is displayed on the monitor 4 by pressing the program-table button switch 144 of the remote commander 5. When the up button switch 135 through the right button switch 138 are manipulated, the cursor is shifted onto a predetermined broadcast channel of the entire program table displayed as shown in Fig. 8, and

then, when the select button switch 131 is further pressed, the program table of the broadcast channel is displayed on the monitor 4, as illustrated in Fig. 9.

[0166]

When the entire program table, such as that shown in Fig. 8, is displayed, the cursor is shifted onto the predetermined current program, and then, when the select button switch 131 is manipulated, the CPU 29 controls the tuner 21 to receive the program.

[0167]

It should be noted that the various logos shown in the drawings are for the convenience of illustration only and are not intended to be used for actual broadcast programs.

[0168]

A description has been given in the context that the present invention is applied to the IRD 2 by way of example. It may, however, possible to build this IRD into the monitor (television receiver) 4.

[0169]

[Advantages]

According to the electronic program guide transmitting apparatus set forth in claim 1 and the electronic program guide transmitting method set forth in claim 3, data concerning an electronic program guide including the reduced-size still pictures of the typical frames of the

programs that are broadcast on a plurality of broadcast channels are generated, and the still pictures are transmitted by being superimposed on the image data of the program.

[0170]

According to the electronic program guide receiving apparatus set forth in claim 4 and the electronic program guide receiving method set forth in claim 8, data representing programs and data representing an electronic program guide including the reduced-size still pictures of the typical frames of the programs are received. When an instruction is given to display the guide, the still pictures are selected as the electronic program guide and displayed by being superimposed on the program image.

[0171]

According to the electronic program guide transmitting and receiving system set forth in claim 9 and the electronic program guide transmitting and receiving method set forth in claim 10, data representing an electronic program guide including the reduced-size still pictures of the typical frames of the programs that are broadcast on a plurality of broadcast channels is generated, and the still pictures are transmitted by being superimposed on the image data of the program. Then, the program data and the electronic program guide data are received. When an instruction is given to

display the guide, the still pictures are selected as the electronic program guide and are displayed by being superimposed on the program image.

[0172]

In any of the above cases, the loads applied to the transmitting and receiving ends can be decreased, whereby a desired program can be selected from the electronic program guide speedily and positively.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1 is a block diagram illustrating an example of the configuration of a transmission apparatus formed by the application of an electronic program guide transmitting apparatus of the present invention.

[Fig. 2]

Fig. 2 is a block diagram illustrating an example of the configuration of the promotion-channel generating device 302 shown in Fig. 1.

[Fig. 3]

Fig. 3 illustrates a display example of the promotion channel shown in Fig. 3.

[Fig. 4]

Fig. 4 illustrates a display example of a data stream.

[Fig. 5]

Fig. 5 illustrates the configuration of a title bar.

[Fig. 6]

Fig. 6 illustrates the configuration of a program window.

[Fig. 7]

Fig. 7 illustrates a display example of an information frame.

[Fig. 8]

Fig. 8 illustrates a display example of an entire program table.

[Fig. 9]

Fig. 9 illustrates a display example of a channel program table.

[Fig. 10]

Fig. 10 illustrates a display example of a detailed program explanation (program content).

[Fig. 11]

Fig. 11 illustrates the ranges of program tables and the ranges of program contents.

[Fig. 12]

Fig. 12 illustrates the operation of transmitting EPG information through transponders.

[Fig. 13]

Fig. 13 illustrates EPG data.

[Fig. 14]

Fig. 14 illustrates SDT.

[Fig. 15]

Fig. 15 illustrates the configuration of EIT.

[Fig. 16]

Fig. 16 illustrates the format of a still picture.

[Fig. 17]

Fig. 17 illustrates the configuration of TDT.

[Fig. 18]

Fig. 18 illustrates the configuration of PAT.

[Fig. 19]

Fig. 19 illustrates the configuration of PMT.

[Fig. 20]

Fig. 20 is a perspective view illustrating an example of the configuration of an AV system to which the present invention is applied.

[Fig. 21]

Fig. 21 is a block diagram illustrating the electrical connection state of the AV system shown in Fig. 20.

[Fig. 22]

Fig. 22 is a front view illustrating an example of the configuration of the IRD 2 shown in Fig. 20.

[Fig. 23]

Fig. 23 is a block diagram illustrating an example of the internal configuration of the IRD 2 shown in Fig. 20.

[Fig. 24]

Fig. 24 is a plan view illustrating an example of the

configuration of the remote commander 5 shown in Fig. 20.

[Fig. 25]

Fig. 25 illustrates another example of the arrangement of the button switches of the remote commander 5.

[Fig. 26]

Fig. 26 is a block diagram illustrating an example of the internal configuration of the remote commander 5 shown in Fig. 24.

[Fig. 27]

Fig. 27 schematically illustrates the processing executed in the encoder of the transmitting end and in the IRD 2 of the receiving end.

[Fig. 28]

Fig. 28 illustrates the EPG data stored in the EPG area 35A shown in Fig. 23.

[Fig. 29]

Fig. 29 is a block diagram illustrating another example of the configuration of the IRD 2.

[Reference Numerals]

1 AV system

2 IRD

3 parabolic antenna

4 monitor

5 remote commander

21 tuner

23 error-correcting circuit

24 demultiplexer

25 MPEG video decoder

25a DRAM

26 MPEG audio decoder

26a DRAM

29 CPU

35 data buffer memory

35A EPG area

36 SRAM

37 ROM

38 EEPROM

39 IR-receiving section

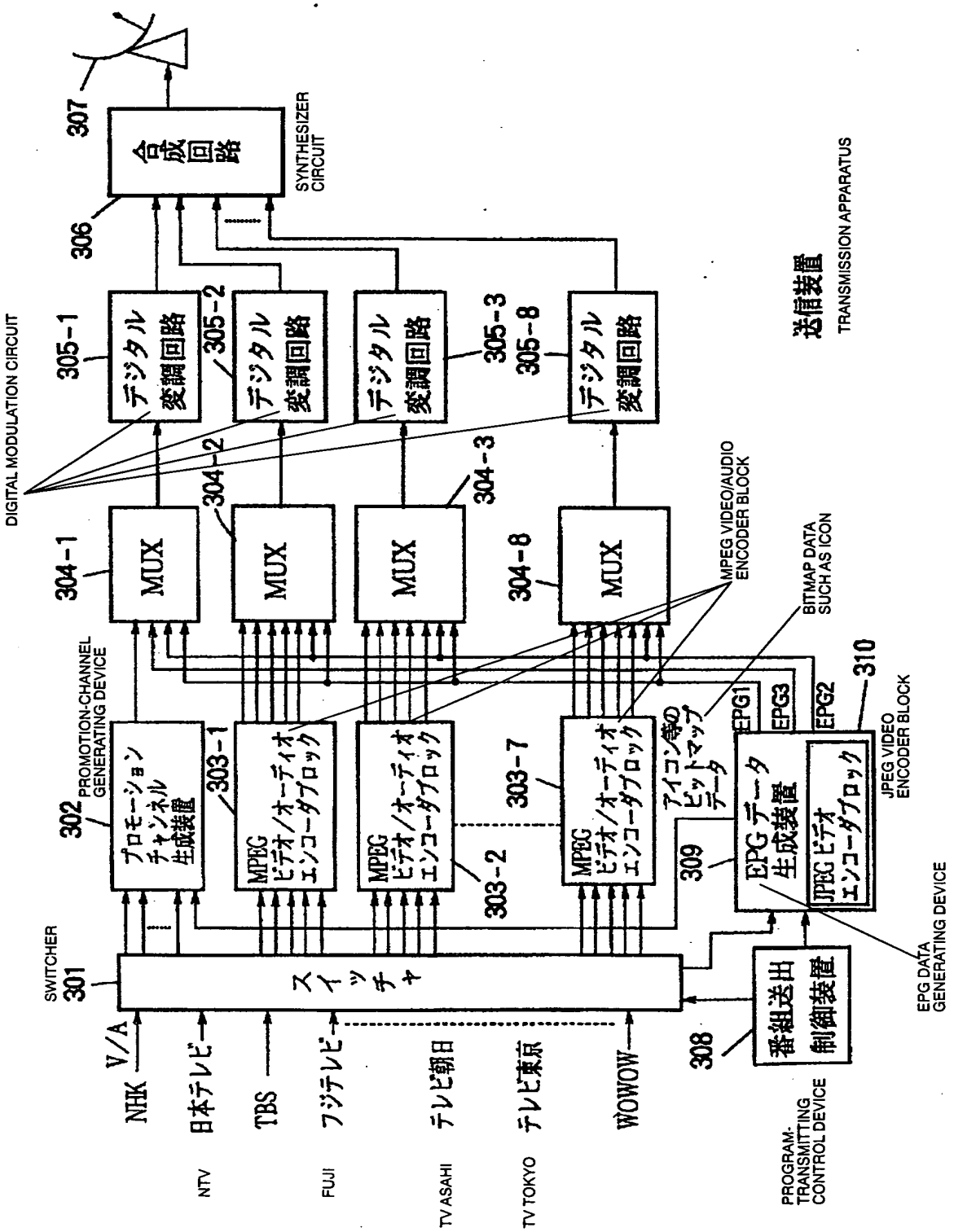
131 select button switch

144 program-table button switch

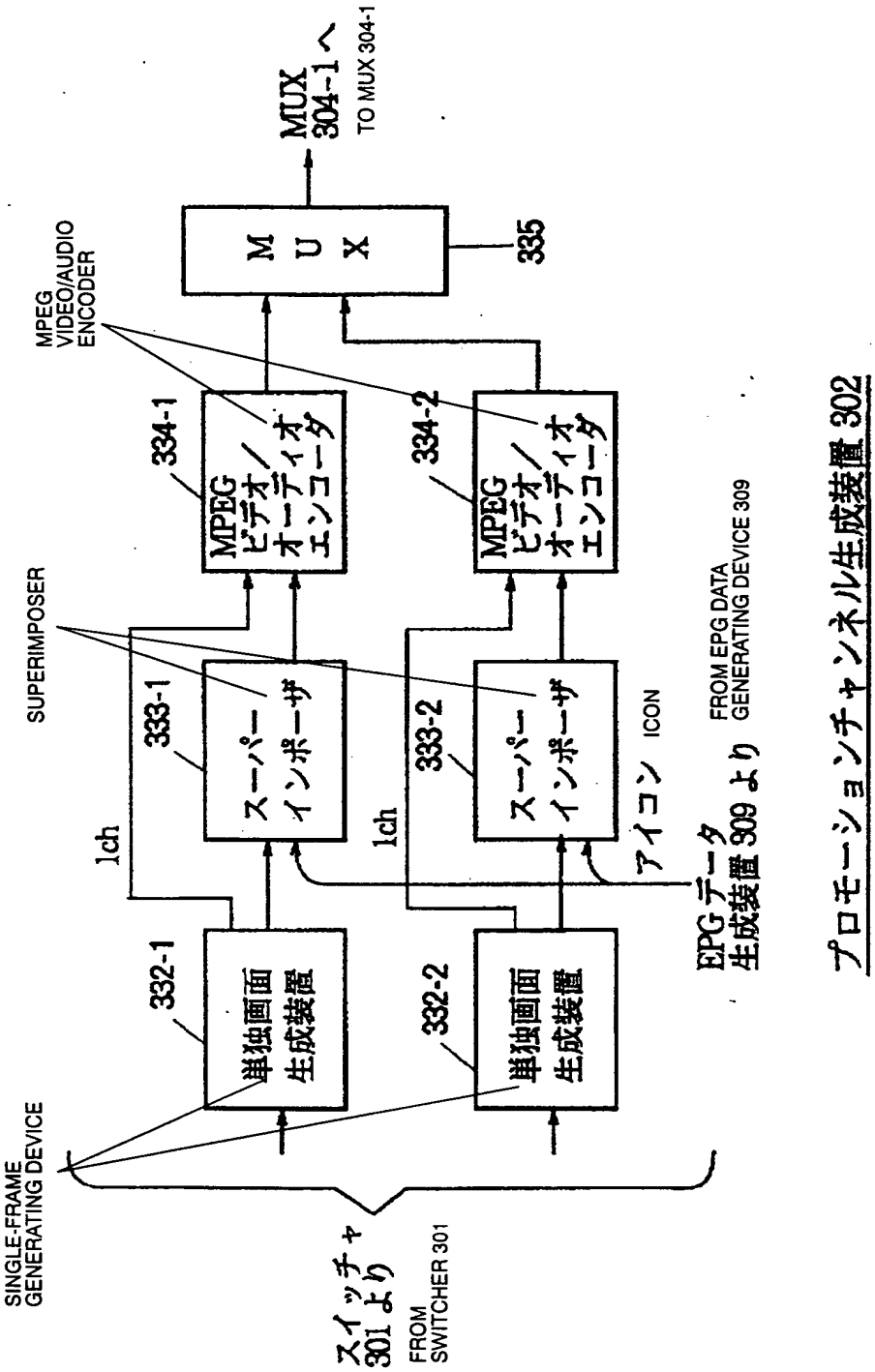
145 information button switch

【書類名】　図面　[Name of Document] DRAWINGS

【図１】 [FIG. 1]

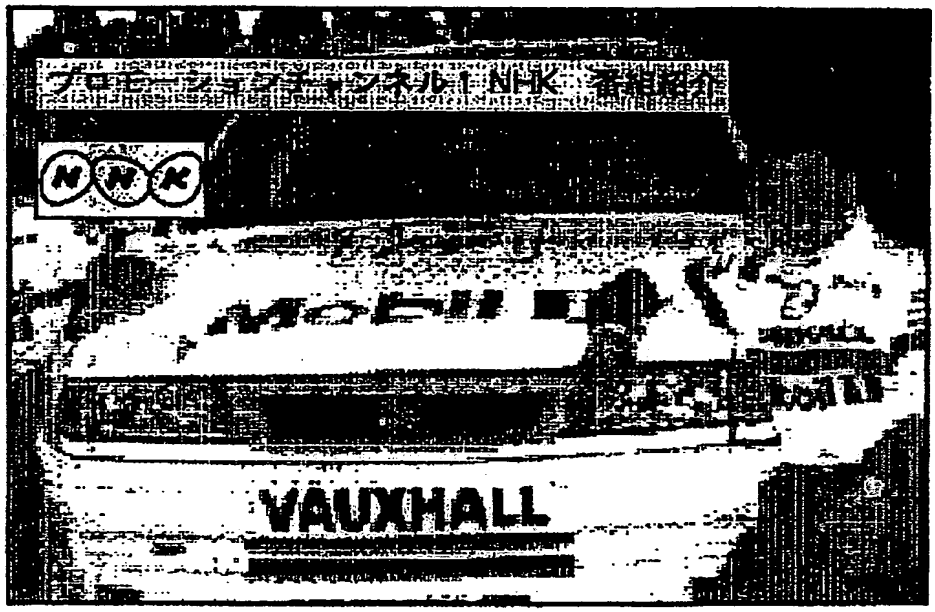


【図２】 [FIG. 2]

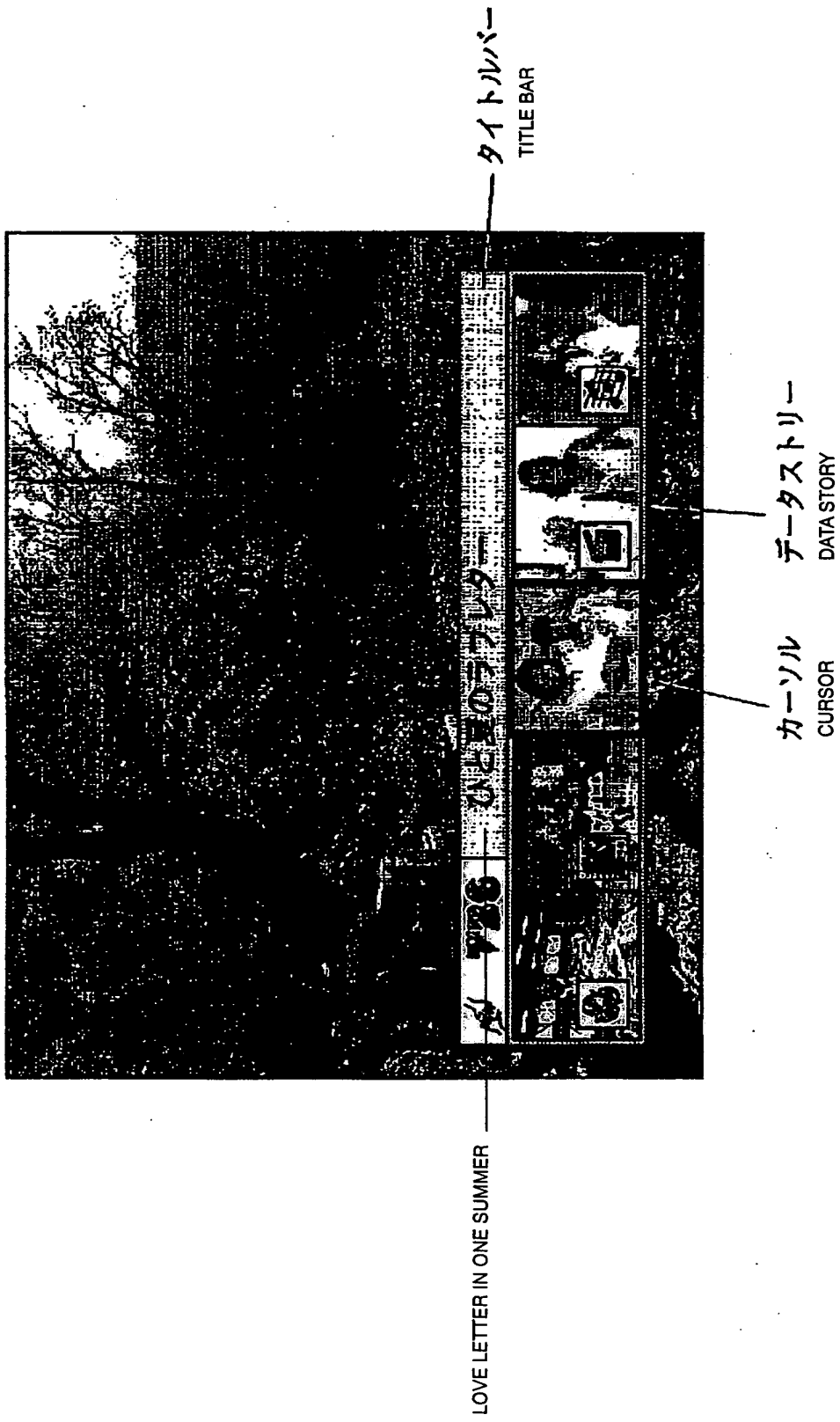

MUX 304-1へ
TO MUX 304-1
MUX
335
MPEG VIDEO/AUDIO ENCODER
334-1
MPEGビデオ／オーディオエンコーダ
334-2
MPEGビデオ／オーディオエンコーダ
SUPERIMPOSER
333-1
スーパーインポーザ
333-2
スーパーインポーザ
1ch
1ch
アイコン ICON
FROM EPG DATA GENERATING DEVICE 309
EPGデータ生成装置309より
332-1
単独画面生成装置
332-2
単独画面生成装置
SINGLE-FRAME GENERATING DEVICE
スイッチャ301より
FROM SWITCHER 301
プロモーションチャンネル生成装置 302
PROMOTION-CHANNEL GENERATING DEVICE 302

【図３】 [FIG. 3]

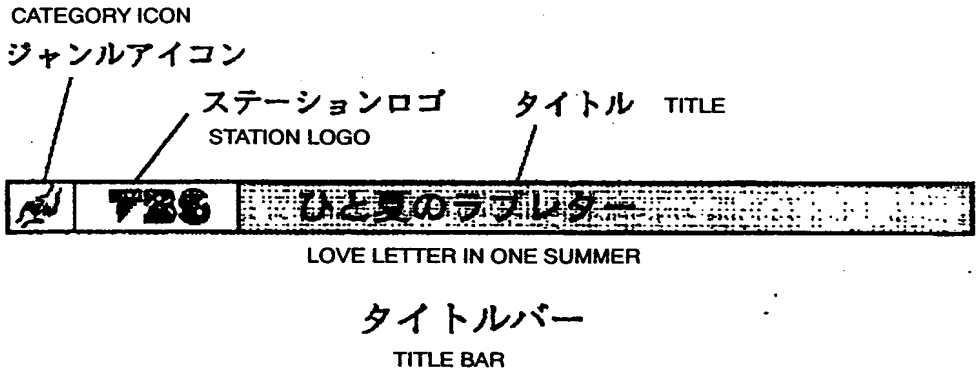
PROMOTION CHANNEL 1 NHK PROGRAM INTRODUCTION



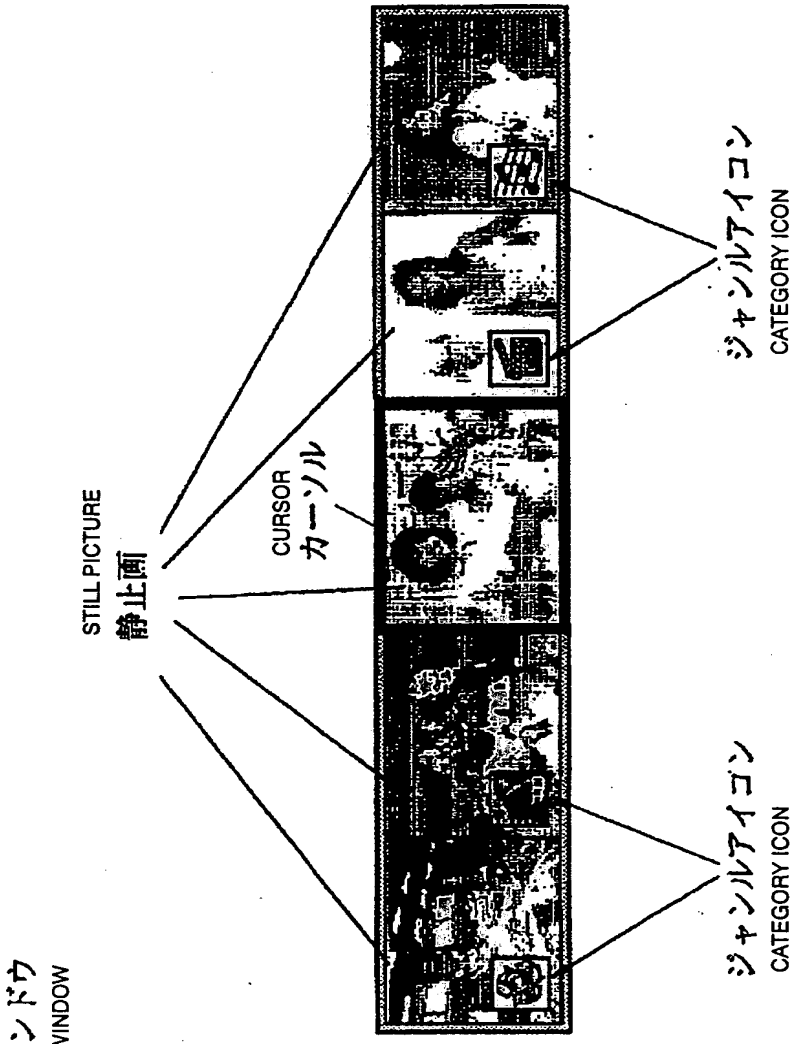
【図４】　[FIG. 4]



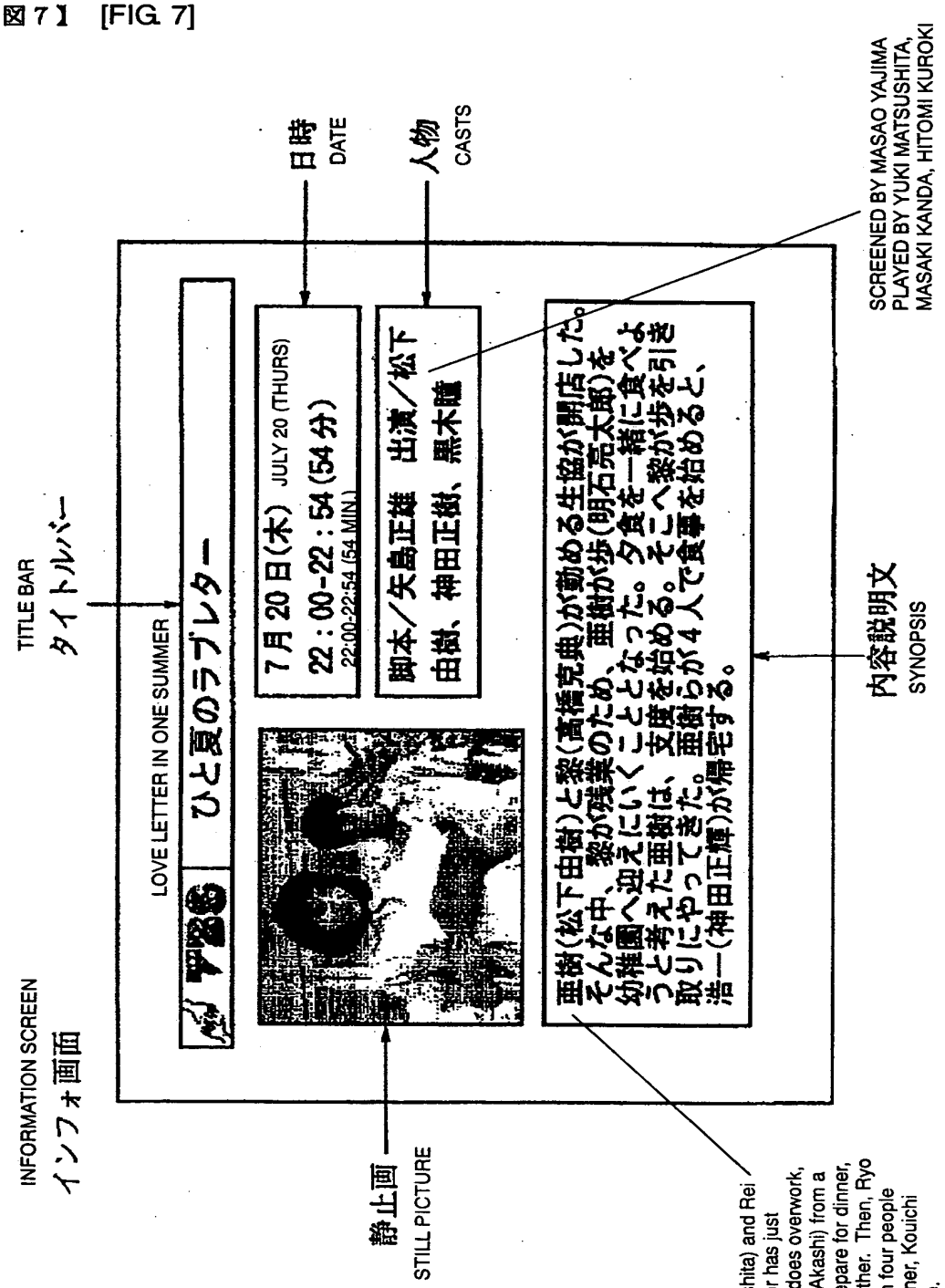
【図５】 [FIG. 5]


CATEGORY ICON
ジャンルアイコン
ステーションロゴ
STATION LOGO
タイトル
TITLE
T28
ひと夏のラブレター
LOVE LETTER IN ONE SUMMER
タイトルバー
TITLE BAR

【図６】 [FIG. 6]

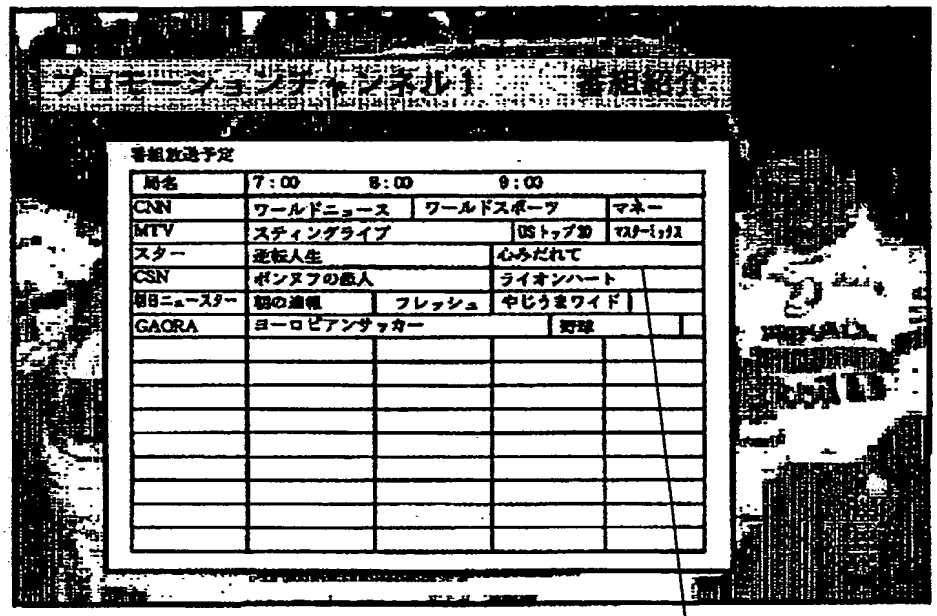


【図７】 [FIG. 7]



【図８】 [FIG. 8]

PROMOTION CHANNEL 1 PROGRAM INTRODUCTION

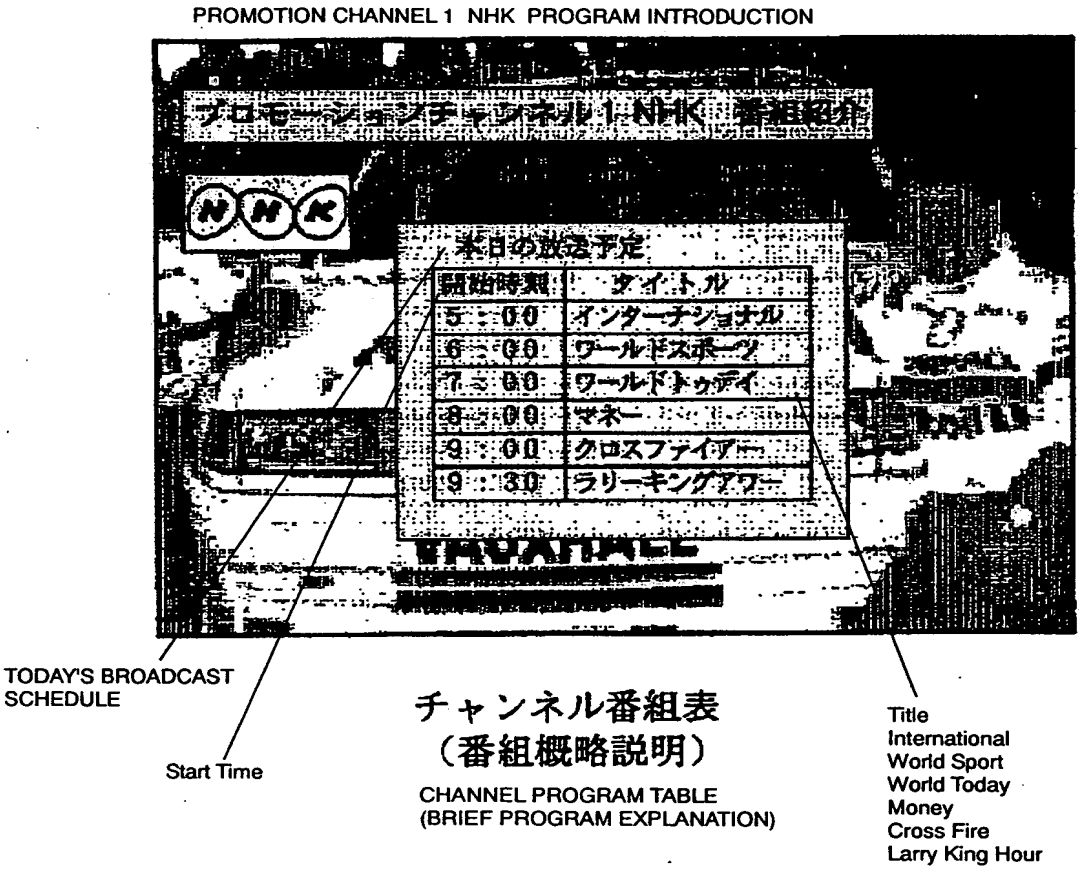


全体番組表
（番組概略説明）

ENTIRE PROGRAM TABLE
(BRIEF PROGRAM EXPLANATION)

CNN World News World Sport Money
MTV Sting Live US Top 20 Master Mix
STAR Life Stinks Heart Burn
CSN Les Amants du Pont-Neuf Lion Heart
Asahi New Star Morning News Fresh Yajiuma Wide
GORA European Football Baseball

【図９】 [FIG. 9]



【図１０】 [FIG. 10]

PROMOTION CHANNEL 1 NHK PROGRAM INTRODUCTION

番組詳細説明

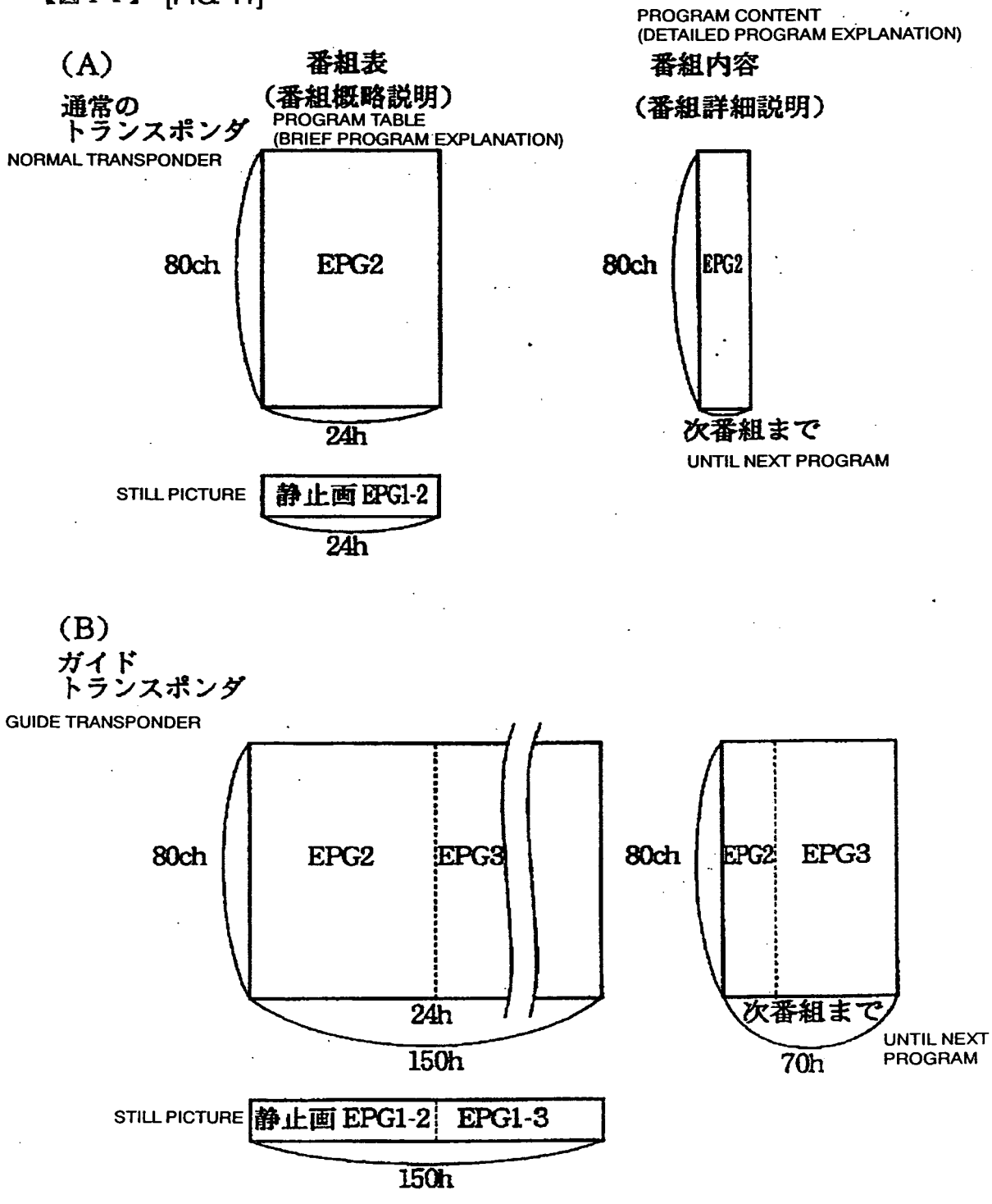
DETAILED PROGRAM EXPLANATION

Program Information NHK

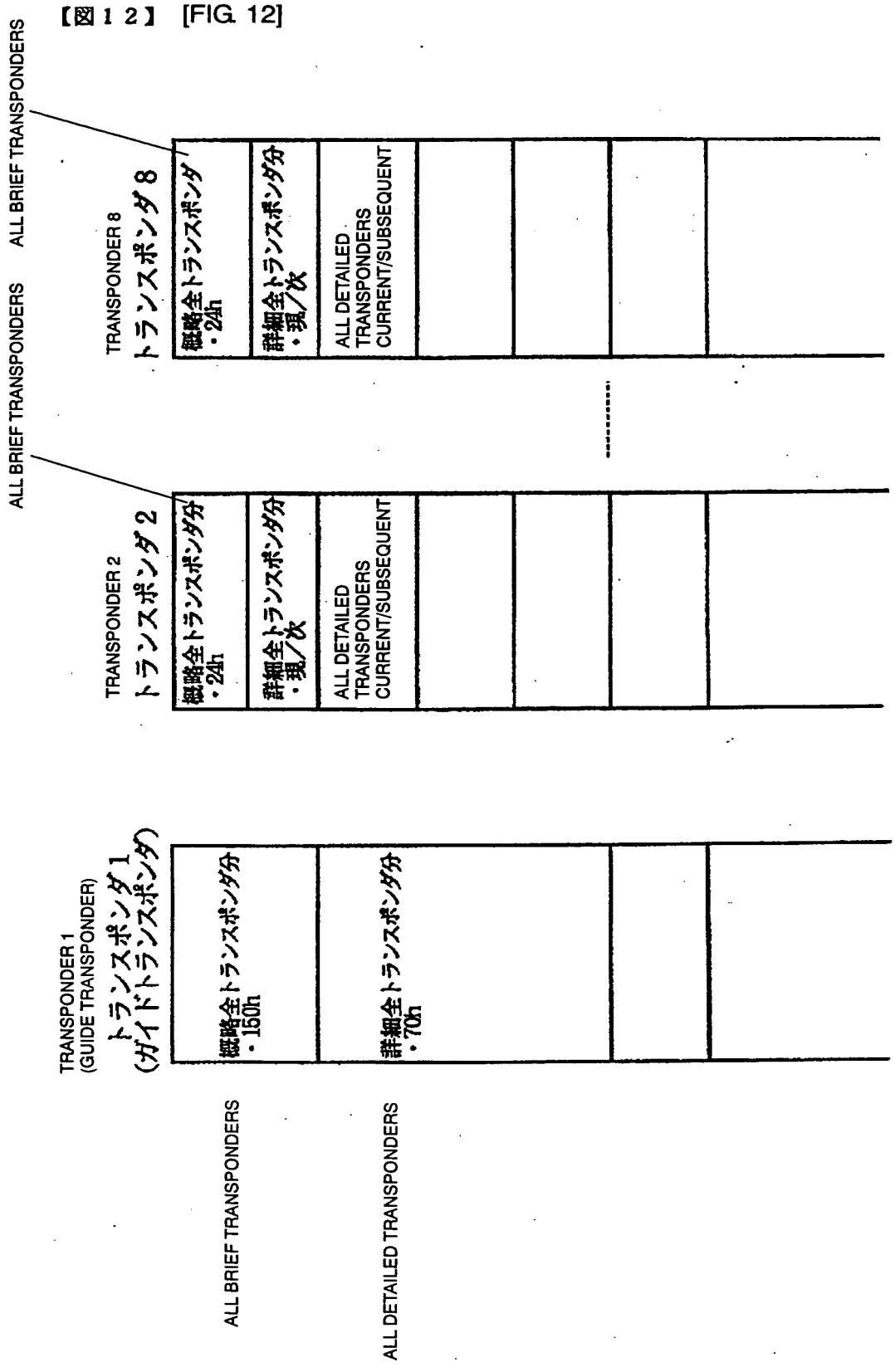
F1 Grand Prix in Monaco

1995 Monaco Grand Prix!
Schumacher awards a fifth grand prize this season?

【図１１】 [FIG. 11]


(A)
通常の
トランスポンダ
NORMAL TRANSPONDER
番組表
(番組概略説明)
PROGRAM TABLE
(BRIEF PROGRAM EXPLANATION)
80ch
EPG2
24h
STILL PICTURE
静止画 EPG1-2
24h
PROGRAM CONTENT
(DETAILED PROGRAM EXPLANATION)
番組内容
(番組詳細説明)
80ch
EPG2
次番組まで
UNTIL NEXT PROGRAM
(B)
ガイド
トランスポンダ
GUIDE TRANSPONDER
80ch
EPG2
EPG3
24h
150h
STILL PICTURE
静止画 EPG1-2
EPG1-3
150h
80ch
EPG2
EPG3
次番組まで
70h
UNTIL NEXT
PROGRAM

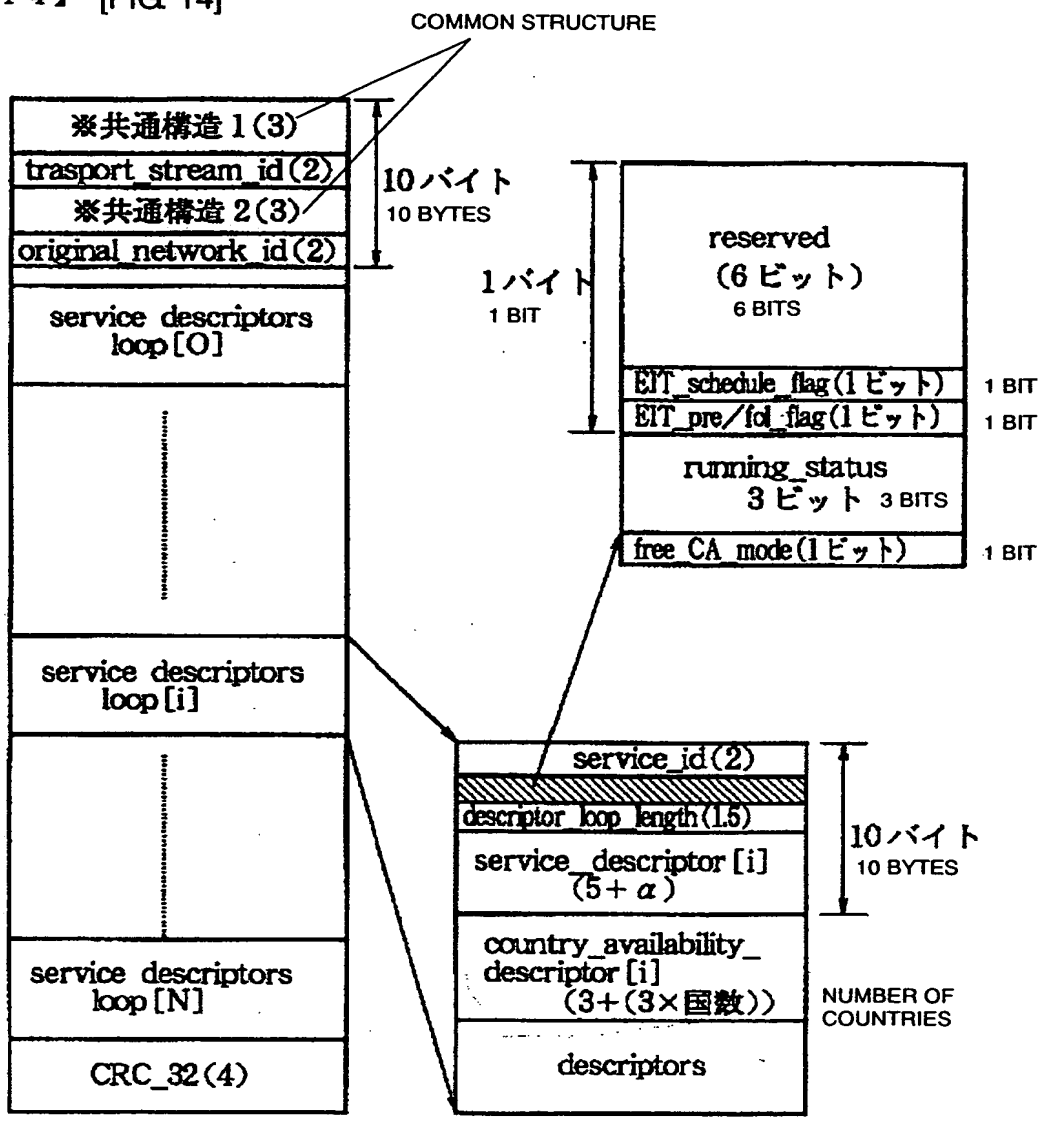
【図１２】 [FIG. 12]


ALL BRIEF TRANSPONDERS
ALL BRIEF TRANSPONDERS
TRANSPONDER 1
(GUIDE TRANSPONDER)
トランスポンダ1
(ガイドトランスポンダ)
概略全トランスポンダ分
・150h
詳細全トランスポンダ分
・70h
TRANSPONDER 2
トランスポンダ2
概略全トランスポンダ分
・24h
詳細全トランスポンダ分
・現／次
ALL DETAILED TRANSPONDERS CURRENT/SUBSEQUENT
TRANSPONDER 8
トランスポンダ8
概略全トランスポンダ
・24h
詳細全トランスポンダ分
・現／次
ALL DETAILED TRANSPONDERS CURRENT/SUBSEQUENT
ALL BRIEF TRANSPONDERS
ALL DETAILED TRANSPONDERS

【図13】 [FIG. 13]

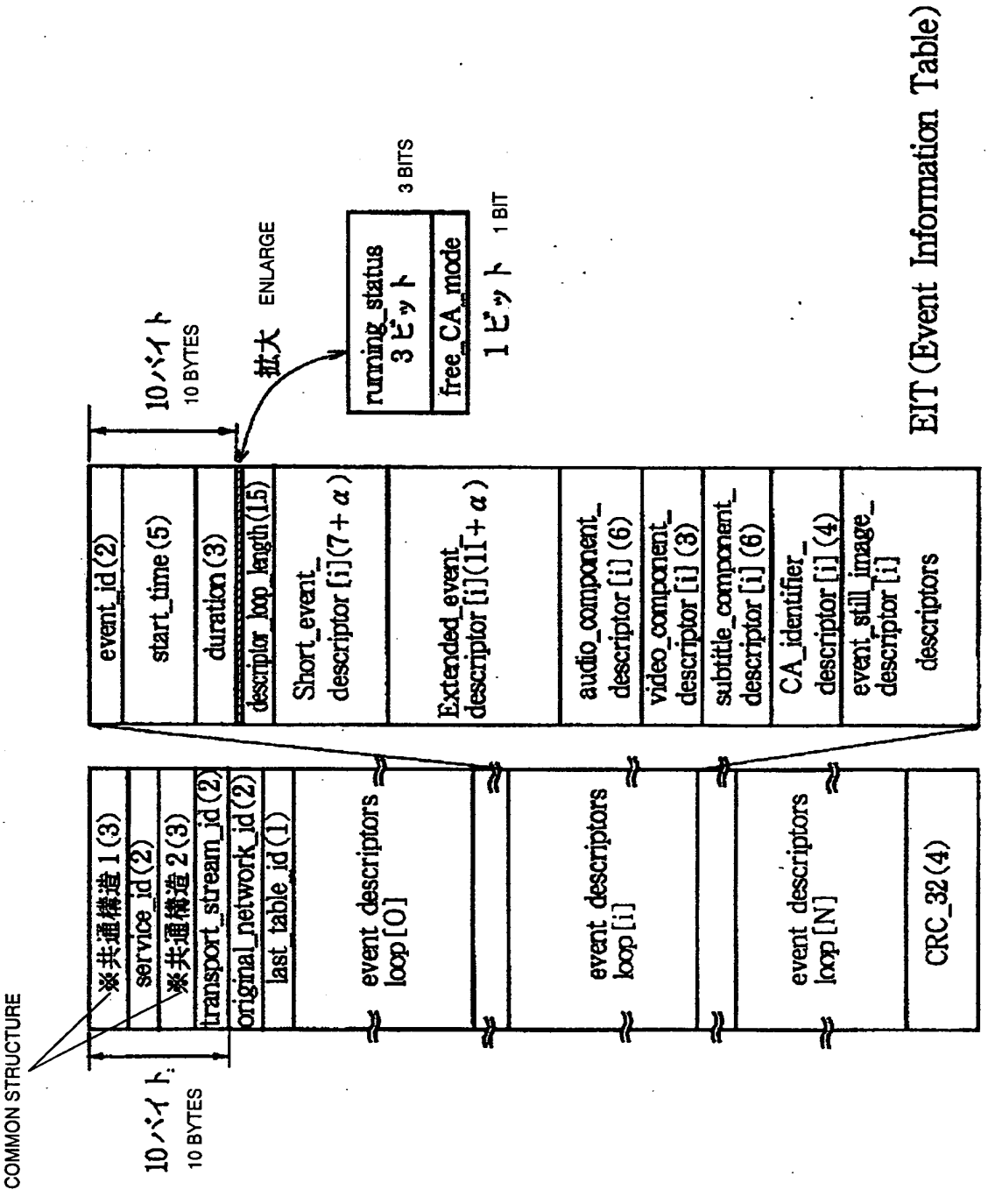
ITEM	項目	(item,) descriptor (テーブル) (TABLE)	DATA LENGTH データ長	NOTES 備考
SERVICE PROVIDER	サービス供給者	(service_provider) Service Descriptor (SDT)		
SERVICE NAME	サービス名	(service_name) Service Descriptor (SDT)		
SERVICE TYPE	サービス型	(service_type) Service Descriptor (SDT)	1バイト 1 BYTE	
TITLE	タイトル	(event_name) Short Event Descriptor (EIT)	60バイト 60 BYTES	
SUBTITLE (TYPE)	サブタイトル(型)	(Component Descriptor (EIT)	1バイト 1 BYTE	データ未定義 DATA NOT DEFINED
CURRENT TIME AND DATE	現在日時	UTC_time (TDT)	5バイト 5 BYTES	
PROGRAM START TIME	番組開始時刻	start_time (EIT)	5バイト 5 BYTES	
PROGRAM DURATION (END TIME)	番組時間長(終了時刻)	End_time (EIT)	3バイト 3 BYTES	
Parental Rate	Parental Rate	Parental Rating Descriptor (EIT)	1(+3)バイト 1(+3) BYTES	国番号毎対応 BASED ON COUNTRY NUMBER
PRICE	価格			
VIDEO MODE	映像モード	Component Descriptor (EIT)	1バイト 1 BYTE	
PROVIDE LANGUAGE	提供言語	ISO639 language Descriptor (PMT)	3バイト 3 BYTES	
PROVIDE SOUND MODE	提供音声モード	Component Descriptor (EIT)	1バイト 1 BYTE	
CATEGORY	カテゴリー	Content Descriptor (EIT)	2バイト 2 BYTES	
BRIEF PROGRAM EXPLANATION	番組概略説明	Short Event Descriptor (EIT)	64バイト 64 BYTES	
DETAILED PROGRAM EXPLANATION	番組詳細説明	Extended Event Descriptor (EIT)	256バイト 256 BYTES	
PROMOTION INFORMATION	プロモーション情報	Promotion Descriptor (SDT)		

【図１４】 [FIG. 14]

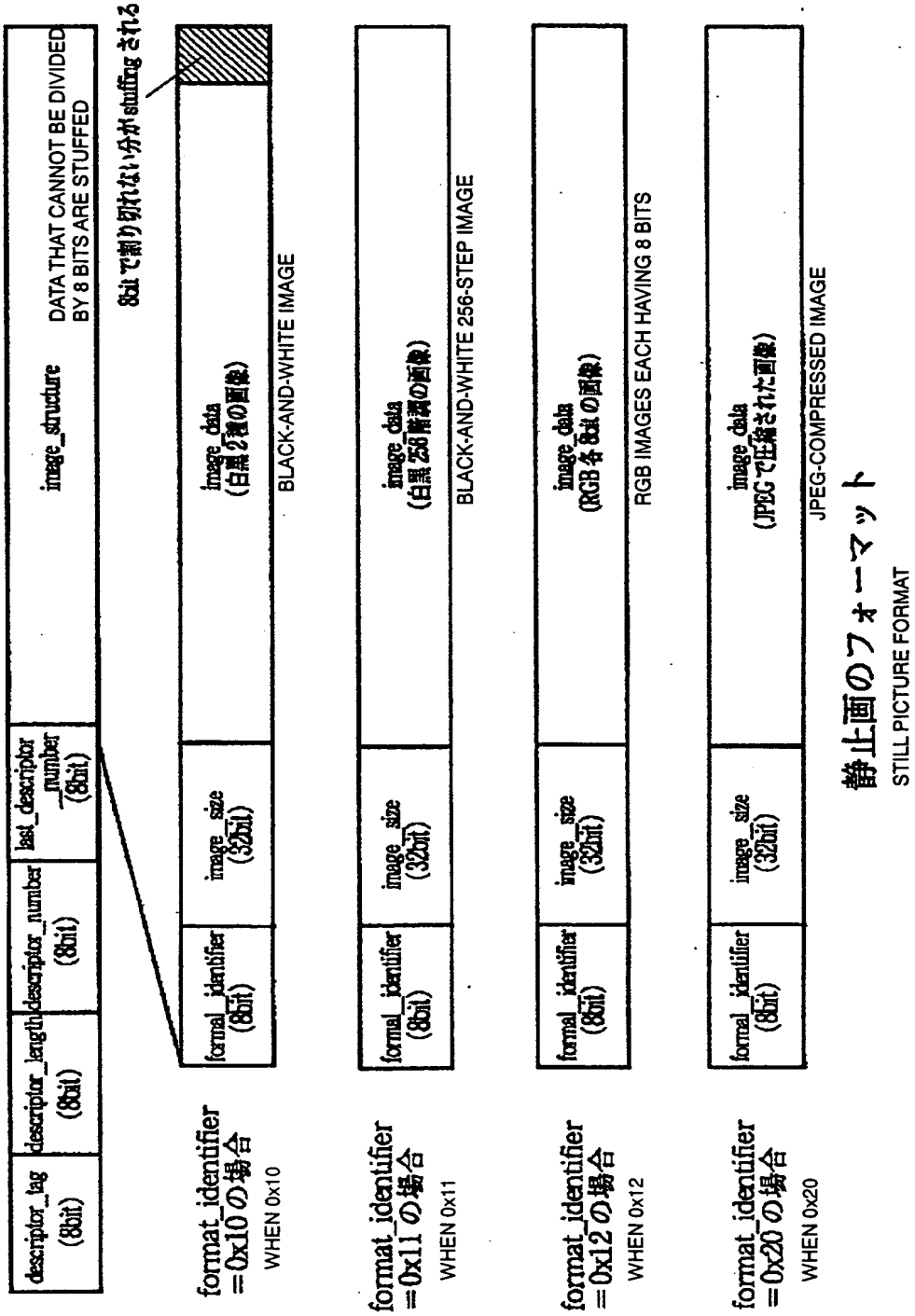


SDT (Service Description Table)

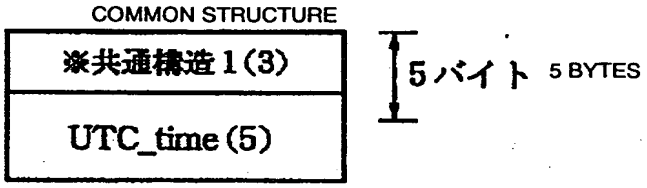
【図１５】 [FIG. 15]


EIT (Event Information Table)
COMMON STRUCTURE
※共通構造1(3)
service_id(2)
※共通構造2(3)
transport_stream_id(2)
original_network_id(2)
last_table_id(1)
10バイト
10 BYTES
event_id(2)
start_time(5)
duration(3)
descriptor_loop_length(15)
10バイト
10 BYTES
拡大 ENLARGE
running_status 3ビット
free_CA_mode 1ビット
3 BITS
1 BIT
Short_event_descriptor [i](7+α)
Extended_event_descriptor [i](11+α)
audio_component_descriptor [i] (6)
video_component_descriptor [i] (3)
subtitle_component_descriptor [i] (6)
CA_identifier_descriptor [i] (4)
event_still_image_descriptor [i]
descriptors
event descriptors loop [0]
event descriptors loop [i]
event descriptors loop [N]
CRC_32(4)

【図１６】 [FIG. 16]

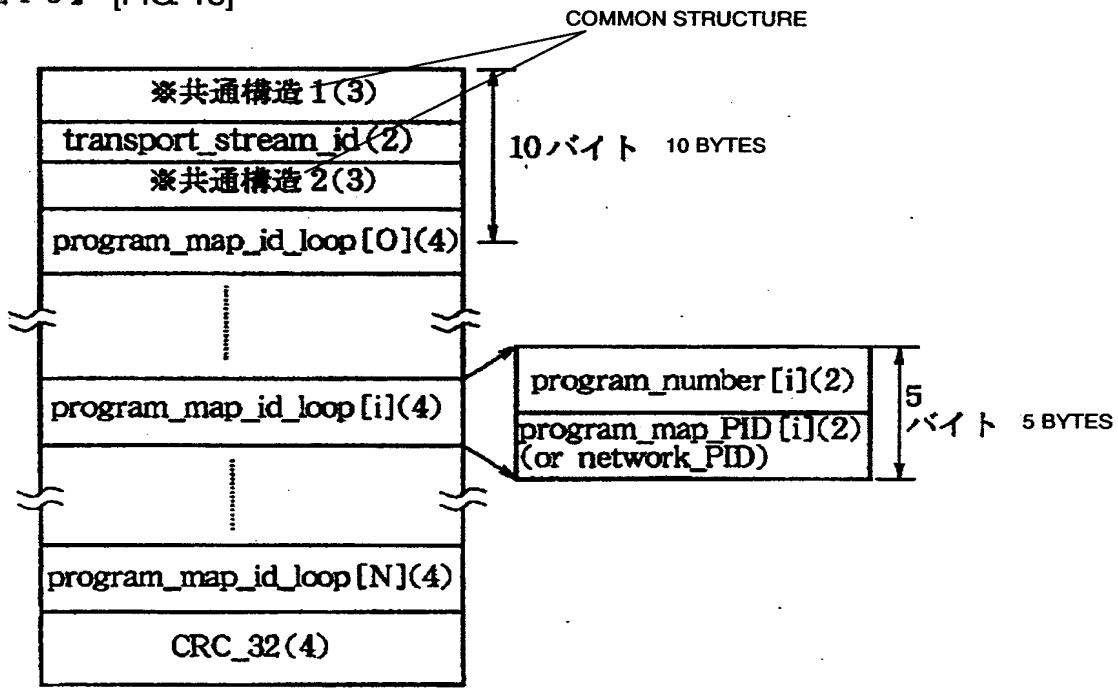

descriptor_tag (8bit)
descriptor_length (8bit)
descriptor_number (8bit)
last_descriptor_number (8bit)
image_structure
DATA THAT CANNOT BE DIVIDED BY 8 BITS ARE STUFFED
8bitで割り切れない分がstuffingされる
format_identifier (8bit)
image_size (32bit)
image_data (白黒2値の画像)
format_identifier =0x10の場合
WHEN 0x10
BLACK-AND-WHITE IMAGE
format_identifier (8bit)
image_size (32bit)
image_data (白黒256階調の画像)
format_identifier =0x11の場合
WHEN 0x11
BLACK-AND-WHITE 256-STEP IMAGE
format_identifier (8bit)
image_size (32bit)
image_data (RGB各8bitの画像)
format_identifier =0x12の場合
WHEN 0x12
RGB IMAGES EACH HAVING 8 BITS
format_identifier (8bit)
image_size (32bit)
image_data (JPEGで圧縮された画像)
format_identifier =0x20の場合
WHEN 0x20
JPEG-COMPRESSED IMAGE
静止画のフォーマット
STILL PICTURE FORMAT

【図１７】 [FIG. 17]



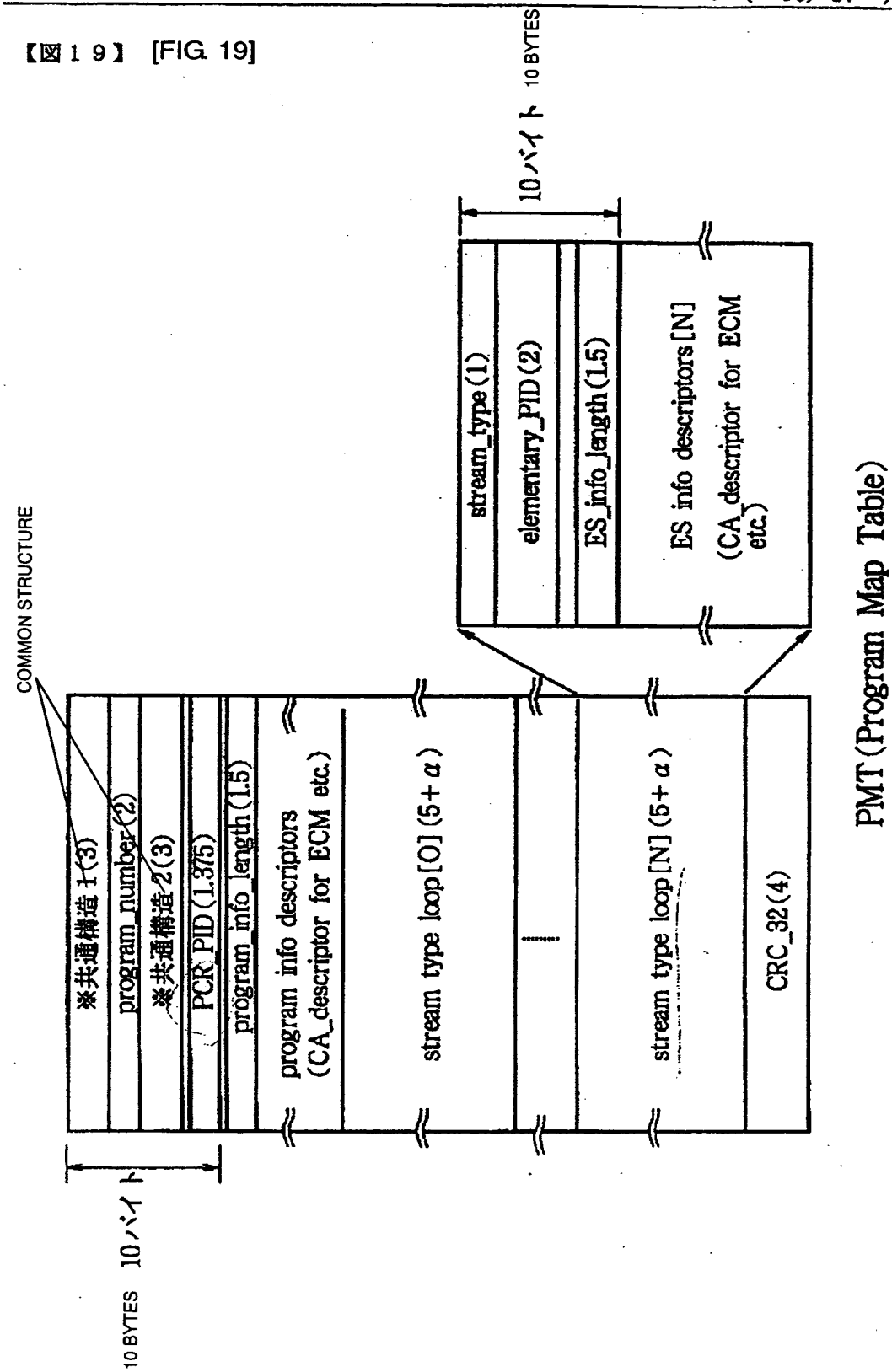
TDT (Time and Data Table)

【図１８】 [FIG. 18]

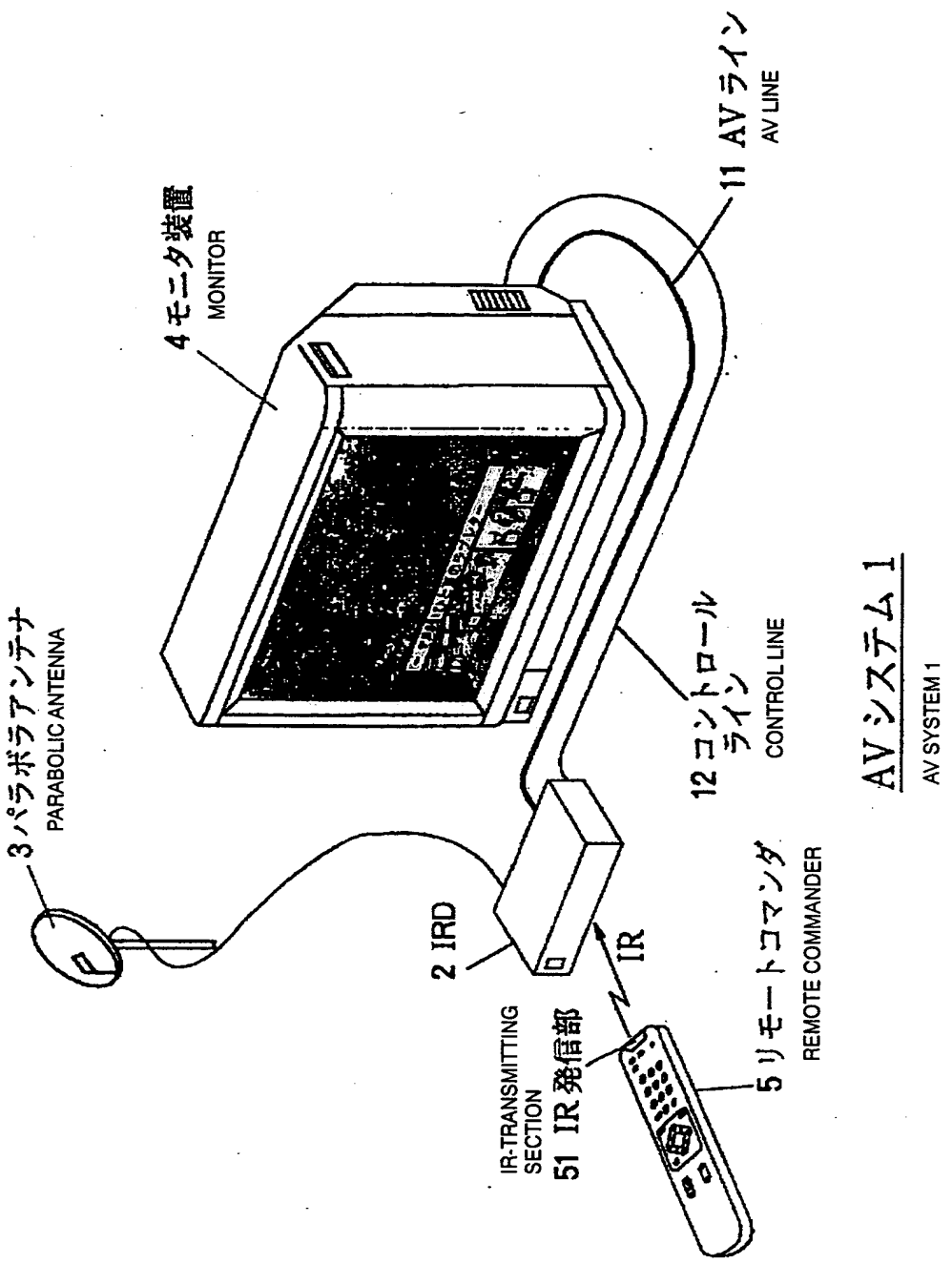


PAT (Program Association Table)

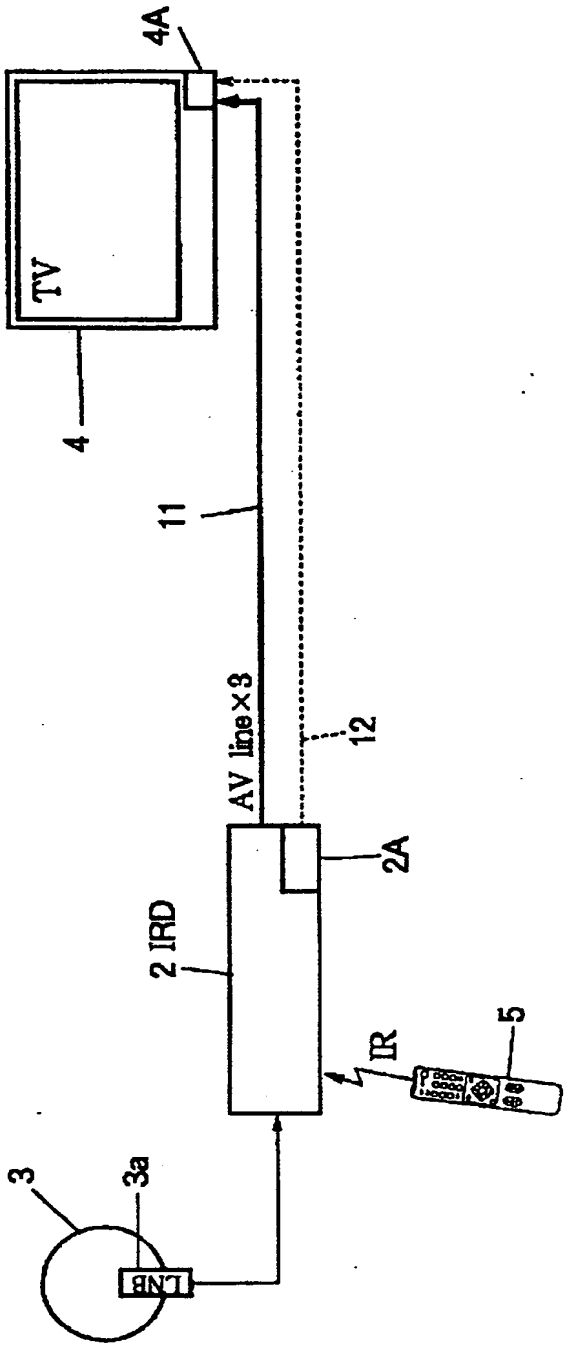
【図１９】 [FIG. 19]


COMMON STRUCTURE
※共通構造１(3)
program_number(2)
※共通構造２(3)
PCR_PID(1.375)
program_info_length(1.5)
program info descriptors (CA_descriptor for ECM etc.)
stream type loop[0] (5+α)
.....
stream type loop[N] (5+α)
CRC_32(4)
10 BYTES
10バイト
stream_type(1)
elementary_PID(2)
ES_info_length(1.5)
ES info descriptors[N] (CA_descriptor for ECM etc.)
10 BYTES
10バイト
PMT (Program Map Table)

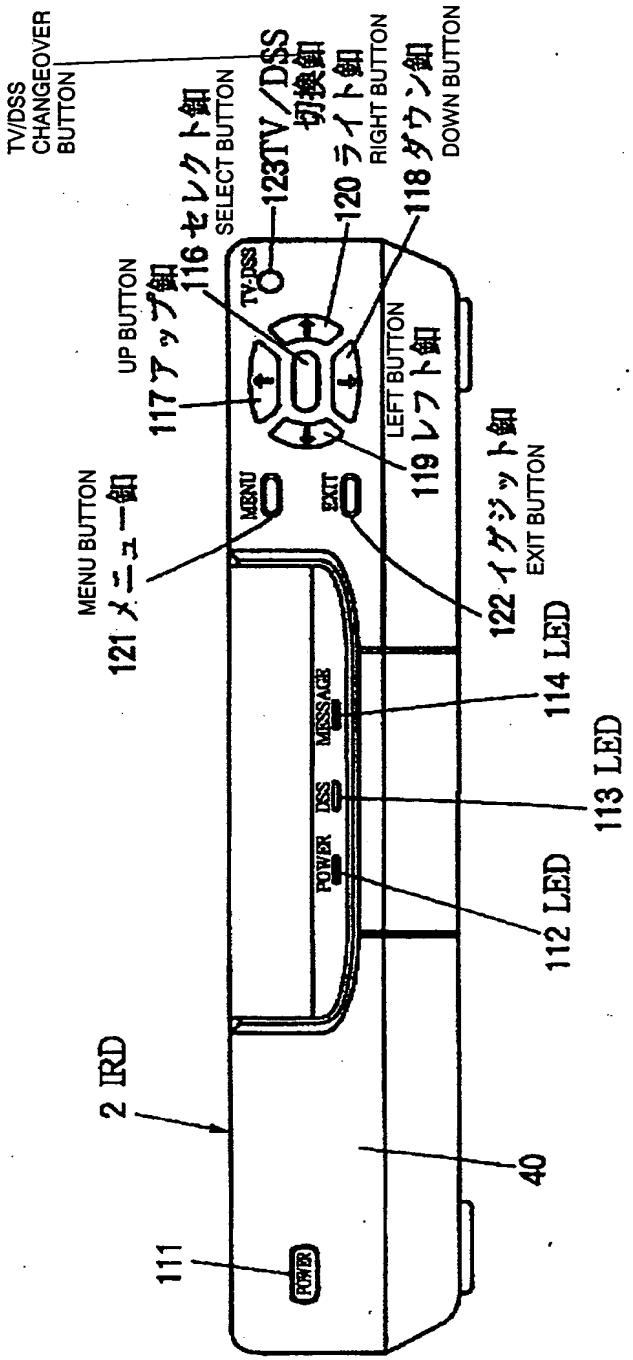
【図２０】 [FIG. 20]


11 AVライン
AV LINE
4 モニタ装置
MONITOR
3 パラボラアンテナ
PARABOLIC ANTENNA
12 コントロールライン
CONTROL LINE
AVシステム 1
AV SYSTEM 1
2 IRD
IR
IR-TRANSMITTING SECTION
51 IR発信部
5 リモートコマンダ
REMOTE COMMANDER

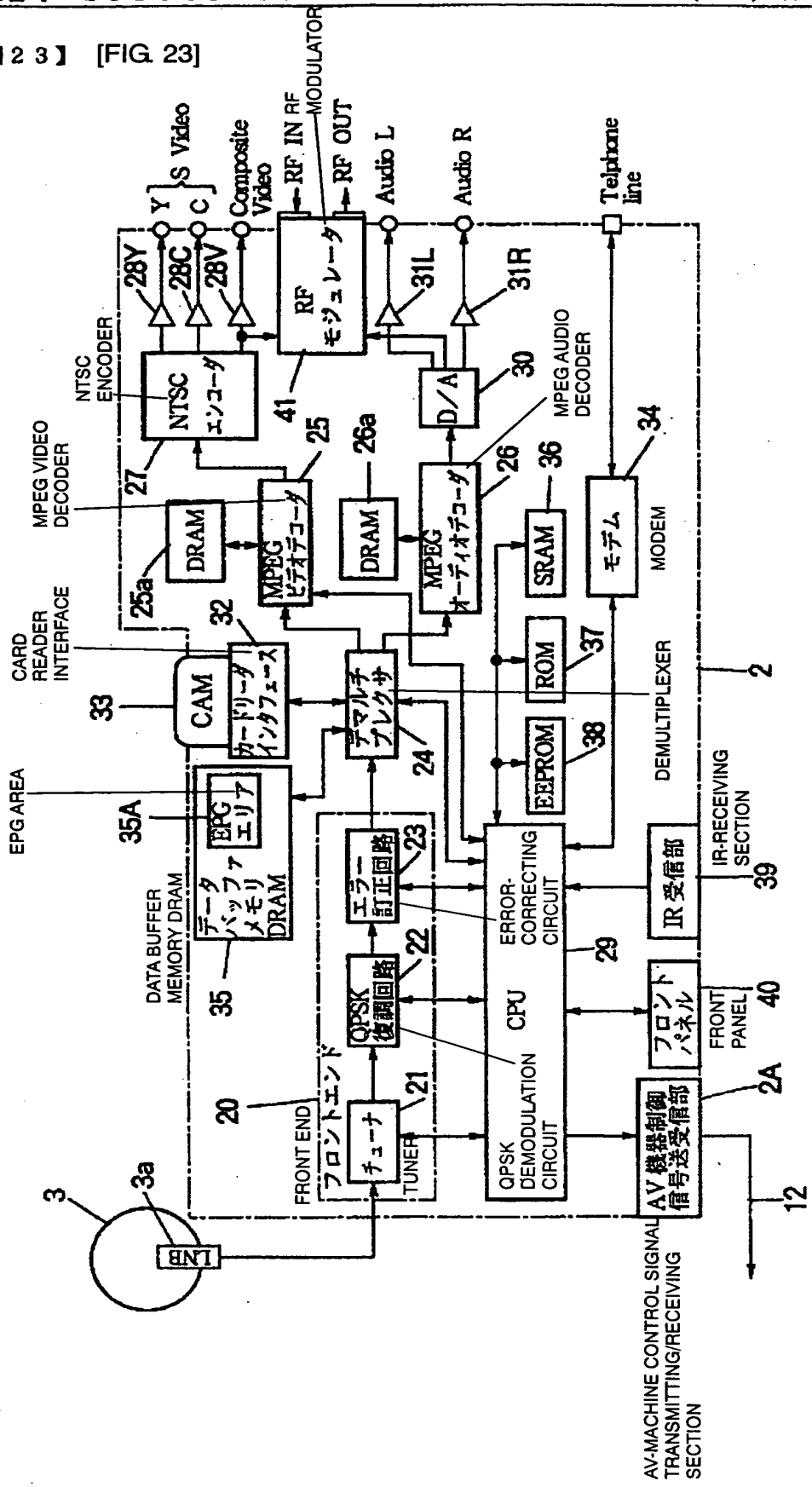
【図２１】 [FIG. 21]



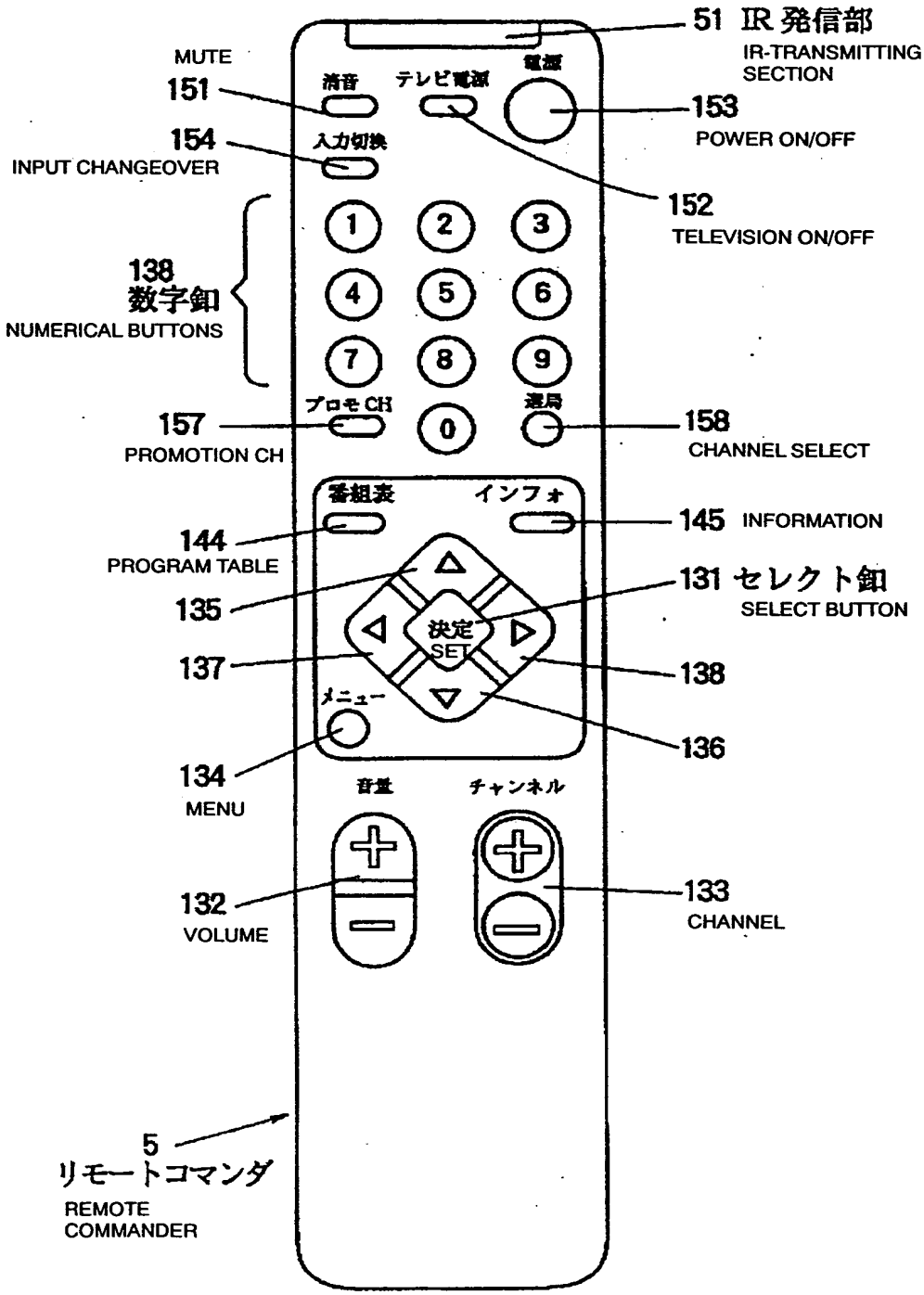
【図２２】 [FIG. 22]


TV/DSS CHANGEOVER BUTTON
123TV／DSS 切換釦
SELECT BUTTON
116 セレクト釦
RIGHT BUTTON
120 ライト釦
DOWN BUTTON
118 ダウン釦
UP BUTTON
117 アップ釦
LEFT BUTTON
119 レフト釦
MENU BUTTON
121 メニュー釦
EXIT BUTTON
122 イグジット釦
114 LED
113 LED
112 LED
2 IRD
40
111
TV/DSS
MENU
EXIT
MESSAGE
DSS
POWER

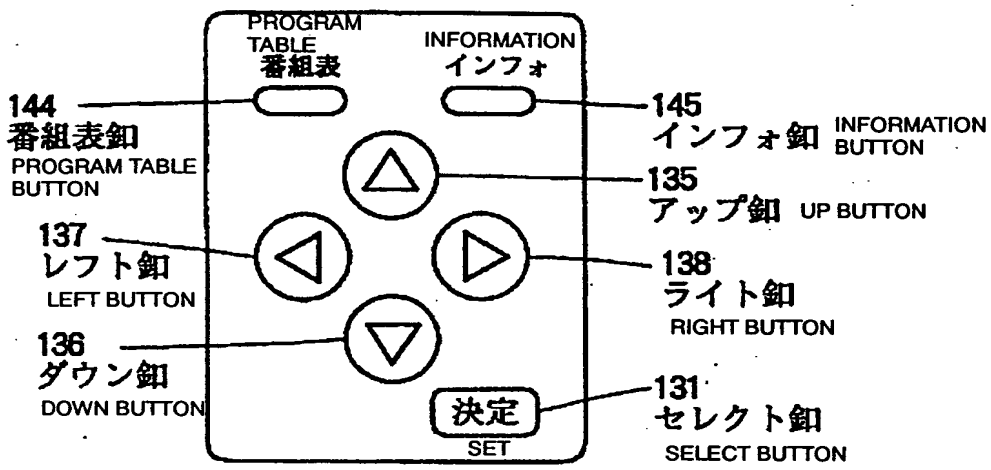
【図２３】 [FIG. 23]


S Video
Y
C
Composite Video
RF IN
RF OUT
RF MODULATOR
Audio L
Audio R
Telphone line
28Y
28C
28V
RF モジュレータ
31L
31R
NTSC ENCODER
NTSC エンコーダ
D/A
30
MPEG AUDIO DECODER
41
MPEG VIDEO DECODER
27
25
26a
26
36
34
DRAM
MPEG ビデオデコーダ
DRAM
MPEG オーディオデコーダ
SRAM
モデム
MODEM
25a
CARD READER INTERFACE
32
CAM
カードリーダ インタフェース
33
デマルチプレクサ
ROM
37
DEMULTIPLEXER
2
24
EEPROM
38
EPG AREA
35A
EPG エリア
データバッファメモリ DRAM
DATA BUFFER MEMORY DRAM
35
エラー訂正回路
23
ERROR-CORRECTING CIRCUIT
IR 受信部
IR-RECEIVING SECTION
39
QPSK 復調回路
22
CPU
29
フロントパネル
FRONT PANEL
40
フロントエンド
FRONT END
20
チューナ
TUNER
21
QPSK DEMODULATION CIRCUIT
AV 機器制御信号送受信部
2A
3
3a
LNB
12
AV-MACHINE CONTROL SIGNAL TRANSMITTING/RECEIVING SECTION

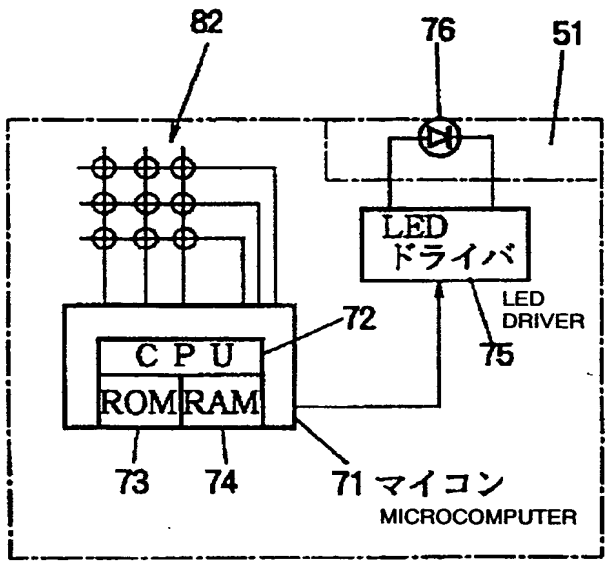
【図２４】 [FIG. 24]


51 IR発信部
IR-TRANSMITTING SECTION
MUTE
151
消音
テレビ電源
電源
153
POWER ON/OFF
154
INPUT CHANGEOVER
入力切換
152
TELEVISION ON/OFF
138
数字釦
NUMERICAL BUTTONS
1
2
3
4
5
6
7
8
9
0
プロモCH
選局
157
PROMOTION CH
158
CHANNEL SELECT
番組表
インフォ
144
PROGRAM TABLE
145 INFORMATION
131 セレクト釦
SELECT BUTTON
135
決定
SET
137
138
メニュー
136
134
MENU
音量
チャンネル
132
VOLUME
133
CHANNEL
5
リモートコマンダ
REMOTE COMMANDER

【図２５】 [FIG. 25]



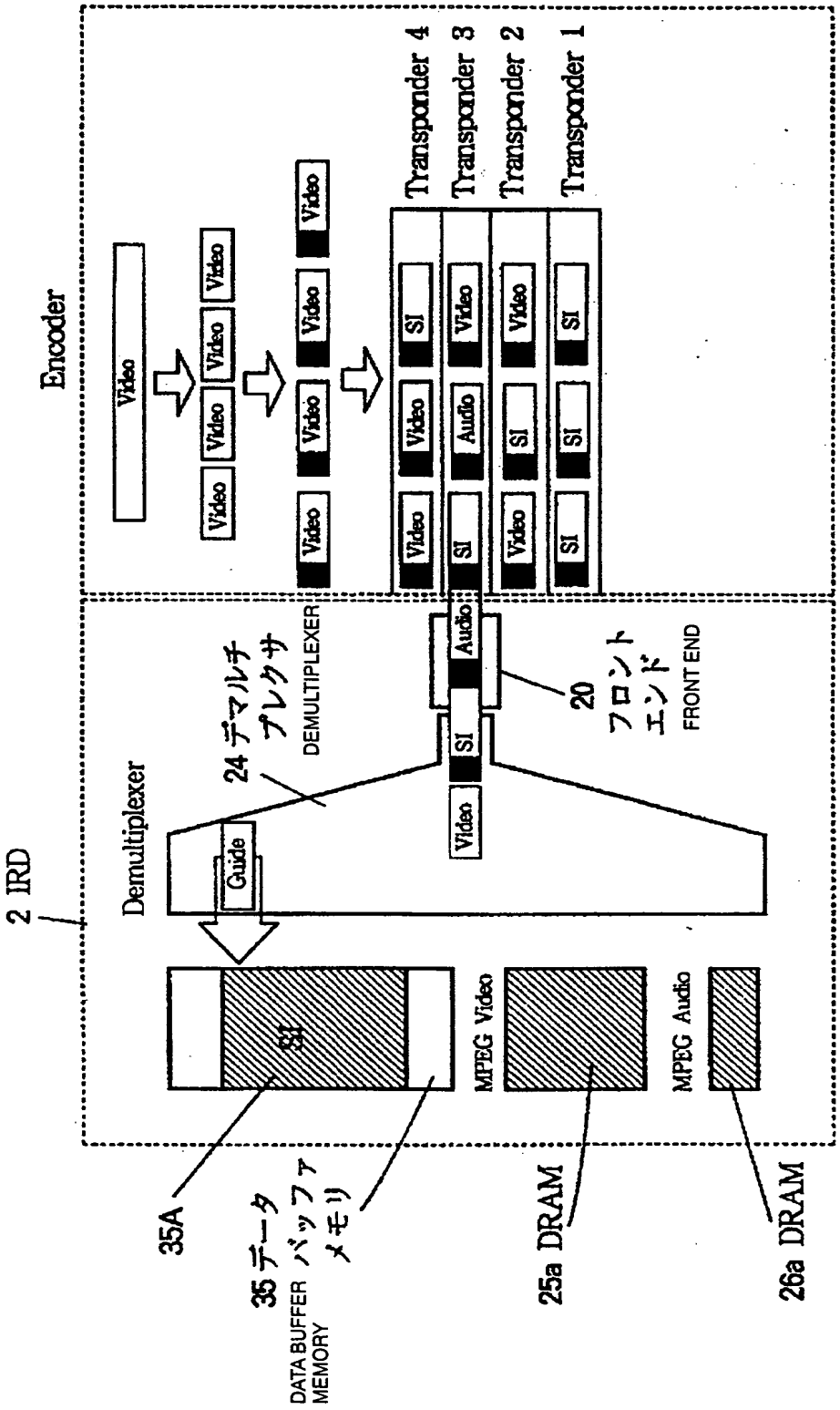
【図２６】 [FIG. 26]



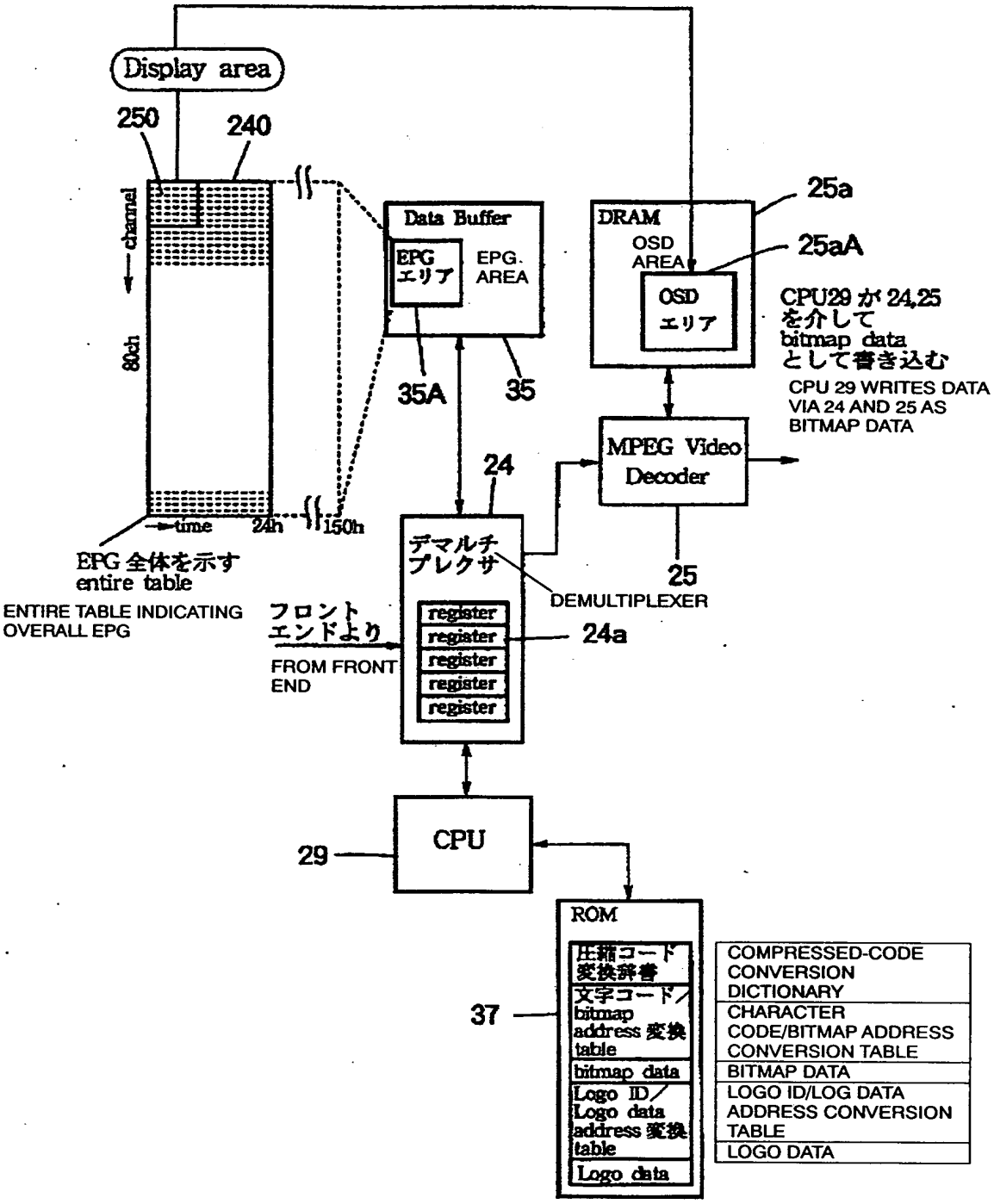
リモートコマンダ 5

REMOTE COMMANDER 5

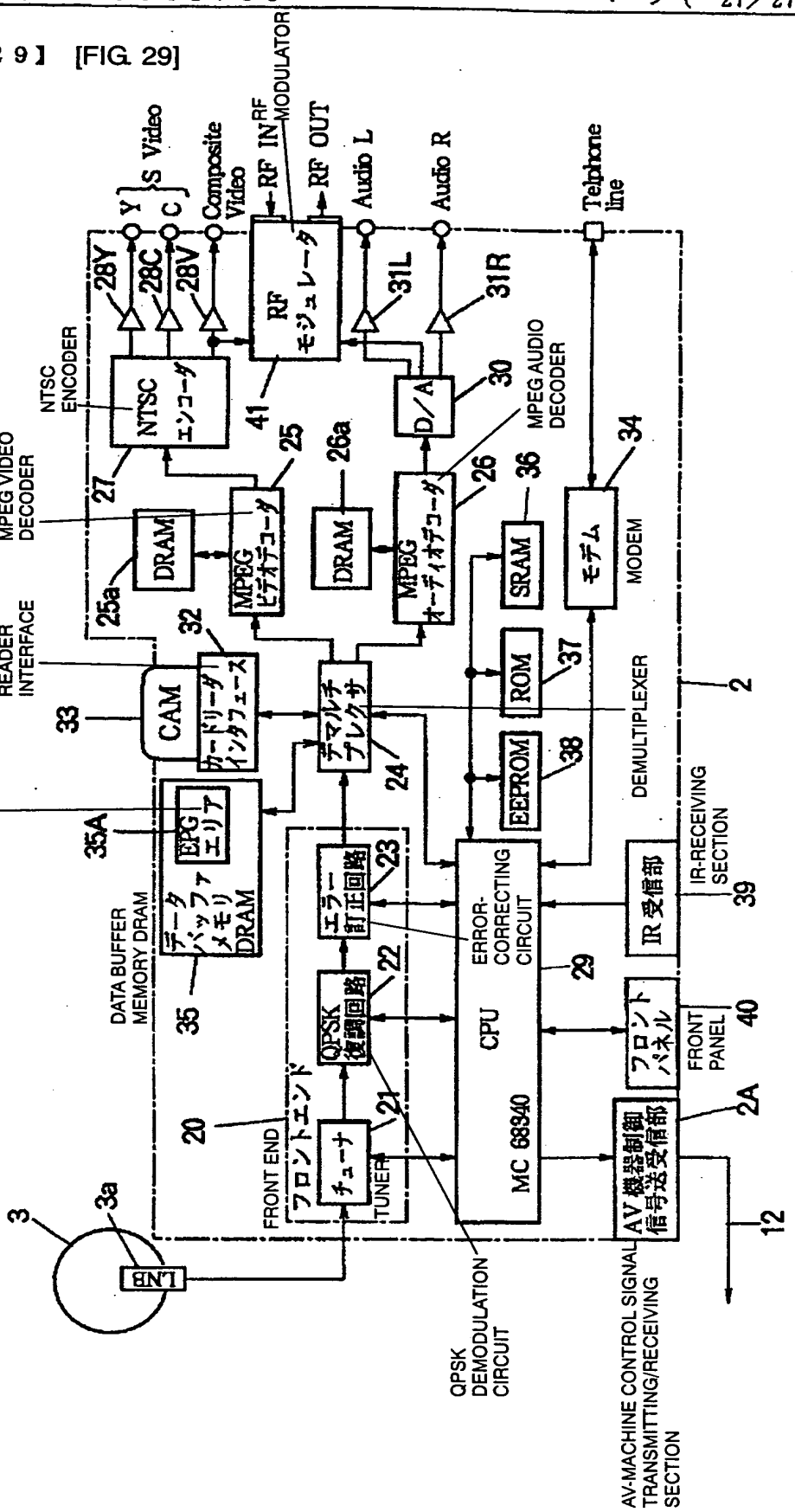
【図２７】 [FIG. 27]


2 IRD
Encoder
Video
Transponder 4
Transponder 3
Transponder 2
Transponder 1
SI
Audio
Demultiplexer
24 デマルチプレクサ
DEMULTIPLEXER
Guide
20 フロントエンド
FRONT END
MPEG Video
MPEG Audio
35A
35 データバッファメモリ
DATA BUFFER MEMORY
25a DRAM
26a DRAM

【図２８】 [FIG. 28]


Display area
250
240
channel
80ch
time
24h
150h
EPG 全体を示す
entire table
ENTIRE TABLE INDICATING
OVERALL EPG
Data Buffer
EPG
エリア
EPG.
AREA
35A
35
DRAM
OSD
AREA
OSD
エリア
25a
25aA
CPU29 が 24,25
を介して
bitmap data
として書き込む
CPU 29 WRITES DATA
VIA 24 AND 25 AS
BITMAP DATA
MPEG Video
Decoder
24
デマルチ
プレクサ
DEMULTIPLEXER
25
フロント
エンドより
FROM FRONT
END
register
register
register
register
register
24a
CPU
29
ROM
37
圧縮コード
変換辞書
文字コード/
bitmap
address 変換
table
bitmap data
Logo ID/
Logo data
address 変換
table
Logo data
COMPRESSED-CODE
CONVERSION
DICTIONARY
CHARACTER
CODE/BITMAP ADDRESS
CONVERSION TABLE
BITMAP DATA
LOGO ID/LOG DATA
ADDRESS CONVERSION
TABLE
LOGO DATA

【図２９】 [FIG. 29]


S Video
Y
C
Composite Video
RF IN
RF MODULATOR
RF OUT
Audio L
Audio R
Telphone line
28Y
28C
28V
RF モジュレータ
31L
31R
NTSC ENCODER
NTSC エンコーダ
41
D/A
30
MPEG AUDIO DECODER
MPEG VIDEO DECODER
27
25
26a
26
36
34
DRAM
MPEG ビデオデコーダ
DRAM
MPEG オーディオデコーダ
SRAM
モデム
MODEM
25a
CARD READER INTERFACE
32
CAM
カードリーダインタフェース
33
デマルチプレクサ
ROM
37
DEMULTIPLEXER
2
24
EEPROM
38
EPG AREA
35A
EPG エリア
データバッファメモリ DRAM
DATA BUFFER MEMORY DRAM
35
エラー訂正回路
23
ERROR-CORRECTING CIRCUIT
IR 受信部
IR-RECEIVING SECTION
39
22
QPSK 復調回路
CPU
MC 68340
29
フロントパネル
FRONT PANEL
40
フロントエンド
FRONT END
20
チューナ
TUNER
21
AV機器制御信号送受信部
2A
3
3a
LNB
12
QPSK DEMODULATION CIRCUIT
AV-MACHINE CONTROL SIGNAL TRANSMITTING/RECEIVING SECTION

[Name of Document] ABSTRACT

[Abstract]

[Object] To decrease a time required for selecting a desired program from a plurality of programs.

[Solving Means] Still pictures of typical frames of each broadcast channel are reduced to a smaller size and transmitted from a transmitting end. A receiving end receives the still pictures and displays them as a data stream. A user shifts a cursor displayed in a reduced-size frame in the data stream to select a desired program.

[Selected Figure] Fig. 4